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ABSTRACT

Between 1974 and 1976 the Two-Year College Development Center conducted a project to provide cognitive style information to faculty, counselors, and administrators at 21 two-year colleges in New York through a series of seminars and workshops. During 1976, the project focused on four questions identified as crucial to the application of cognitive style information at two-year colleges. These were: (1) Does a program in cognitive style information for students improve learning performance? (2) Is there a relationship between students' cognitive styles and their performance on written assignments? (3) Is there an inverse relationship between mismatching of cognitive style and performance in occupational curriculums? (4) Is cognitive style a determinant in the type of materials students select in a learning laboratory? This document compiles the reports of studies undertaken by eleven of the participating colleges to provide answers to the four questions, and an additional study undertaken to investigate the relationship between cognitive style and career choices. Procedures and testing instruments used in the studies are reviewed by the project staff in a separate chapter. The concluding chapter summarizes the studies and makes suggestions for further research. (JDS)

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Project Priority:Occupational Emphasis

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# CRITICAL QUESTIONS

A Report of the Projects
Utilizing Cognitive Style Information
in New York State Two-Year Colleges

Kay Martens, Editor

August, 1976

## PREFACE

The materials in this publication tell about "Project Priority" and "Project Priority Occupational: Emphasis", involving two years of exciting activities during 1974-76 at the Two-Year College Development Center. Prior to the beginning of the project, staff members at the Center decided to find out all they could about cognitive style, about what researchers across the country have learned as to its nature and potential usefulness, and then to enlist the cooperation of New York community colleges for applied studies dealing with cognitive style.

We felt that this university-base and field-oriented Center, with its mission to provide staff development help to two-year college personnel could make an important contribution in this area for our community colleges. Fortunately, the Bureau of Two-Year College Programs of the New York State Education Department agreed strongly with this judgement after reviewing grant proposals for both years, and provided support through ESEA and VEA funds.

These reports illustrate the "fruits" of this major staff development effort. When Project Priority began, the participating counselors and faculty had little knowledge of what cognitive style was and even less idea as to its applicability to the community college. The first year of the project was designed and presented with the intent that the applicability of this concept would be explored in the community college. The 23 participating teams designed their own projects to assess for themselves whether such a project was both practical and valuable. The reports presented here represent the extensive efforts of those individuals and colleges who saw exciting implications for this concept and were willing to invest time and efforts toward the utilization of cognitive style for the improvement of instruction. While all the questions regarding the use of cognitive style are far from answered these reports do suggest important trends and directions. They also illustrate the impact of staff development on a group of colleges. A critical component of the success of the project is, of course, the excellent work and effort carried out by busy faculty members and counselors in these two-year colleges.

William A. Robbins
Director
Two-Year College Development Center

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# Chapter I

## Introduction

The reports presented here were prepared by two-year college faculty and counselors who participated in a two year Cognitive Style project designed and sponsored by the Two-Year College Development Center. This project became known as Project Priority. When participants began with the project in the fall of 1974 they had little or no idea what cognitive style was or what implications it might have for the two-year college student. In January of 1976 a group of them met to review what had been learned in the first year and to suggest the focus the project should take. Out of that meeting came a list of *Critical Questions* regarding the implications of cognitive style. Although the original list was over thirty, four were identified as having the most potential impact. These questions and the participants' attempts to find some of the answers form the basis of this report.

No one involved in the project claims that the answers have been found. In some cases more questions than answers have been generated. However, the individuals involved have learned a great deal about the use of cognitive style information and the process of attempting to systematically study that use. It is hoped that these learnings will be helpful to others interested in cognitive style. It is also hoped that whatever the statistics show, faculty and students have benefited from these efforts.

Several clarifications are in order regarding these projects. None of the participants regard themselves as researchers, yet all were involved in research. It is possible that the lack of results in some cases is reflective of design problems. It is also possible that the small number of students involved in some studies severly limit the findings. In all cases the results are regarded as tenative. There value lies, not in what they show but in the implications they suggest. It should also be noted that participants operated under other constraints. In most

cases the time available from design to final report was approximately two and a half months. All work was done in addition to full teaching or counseling responsibilities. All costs, although generally limited, were borne by the college not the project. Some projects were completed by teams, others by individuals.

For those unfamiliar with either cognitive style or Project Priority a brief introduction to both is provided:

Cognitive Style

Cognitive styles reflect individual differences in information processing. According to Messick (70), they are "unconscious habits that represent an individual's typical modes of perceiving, thinking, remembering, and problem solving." They are typical ways of processing information, regardless of whether that information has its primary sources in the world outside or within the individual. As Witkin (74) notes, the term cognitive can be misleading since they are manifestations in the cognitive domain of still broader dimensions of functioning that cut across other psychological domains, including personality and social behavior. Ausubel (68) sees them as both individual differences in cognitive organization and various self-consistent personal tendencies that are not reflective of human cognitive functioning in general. Witkin makes the point that they are actually broad personal styles of information processing.

Although the exact wording of definitions of cognitive style may vary among researchers, all definitions stress individual differences in information processing. Certain other characteristics of style are generally agreed on by researchers in the field. An individual's style, for example, generally tends to stabilize in early adolescence. Thus cognitive styles are generally regarded as "stable, relatively enduring self-consistencies in the manner or form of cognition" (Messick 70). However, not everyone has a dominant cognitive style on all dimensions of style. Since styles are bi-polar in nature, the individual who has a particular style on any dimension

will fall at one end or the other of the continuum. Cognitive styles are, as is reflected in Messick's definition, generally regarded as unconscious habits. They are spontaneous, unplanned responses to a given situation. As such, they should be distinguished from strategies which are conscious, planned responses, responses that an individual has learned to use in a particular situation. It is when an individual is confronted with a new or ambiguous situation that his style will tend to dominate. It is also important to note that styles, unlike many cognitive and personality factors can be assessed by non-verbal, perceptual means.

Witkin, Messick and Kogan all stress the importance of distinguishing cognitive styles from abilities. Kogan (71) notes a difference in emphasis between the two. "Abilities concern level of skill - the more and less of performance - whereas cognitive styles give greater weight to the manner and form of cognition." Witkin (75) states simply that style "appears to be more related to the 'how' than to the 'how much' of cognitive functioning".

Different cognitive styles have developed both from psychological research and from practitioners interested in individual differences. A variety of cognitive styles have been identified in the psychological literature. Messick (70) lists and describes nine cognitive styles which have been the object of systematic theoretical and empirical examination. These nine appear to be the most solidly established in psychological research. In addition to the nine identified by Messick, Kogan (71) has researched a dimension known as risk-taking vs. caustiousness. "The dimension refers to individual differences in choice of 'high payoff-low probability' options." Although each of these dimensions were identified and researched by different researchers, they share certain common characteristics. All dimensions originated through psychological research. They are all bi-polar in nature, and each bi-polar dimension represents individual differences in information processing

habits or modes. Not all individuals have a particular style on each of these style dimensions. However, those who do have a dominant style, who fall at one end or the other of the continuum of a particular dimension, will process information differently from someone at the other end of the continuum. These styles tend to be stable over time and the "value" of having any particular style is dependent upon the situation.

McKenney and associates at the Harvard Graduate School of Business developed a model of cognitive style which has its origins in the works of Brunner and Witkin. The basic premise of the model is that the world imposes high quantities of data on the individual and that in response, the individual selects and uses only part of that data as "information" (Nelson 74). Rather than being bi-polar, this model includes two dimensions affecting different aspects of information processing: information gathering and information evaluation. The information gathering aspect is the perceptual process by which the mind organizes and codes the wide variety of visual and auditory stimuli it encounters. Individuals may be either perceptive or receptive in this process. The information evaluation dimension relates to problem solving and reflects differences between a systematic and an intuitive approach. Those who have a dominant style on this model are said to have information processing space which delineates the extent to which they tend to use each of the four modes. Initial research with this model was with business school students.

The cognitive styles used in assessing the Critical Questions were field dependence-independence, reflective-impulsive, and the McKenney model.

Project Priority

In July of 1974 the Two-Year College Development Center began a project to provide cognitive style information to faculty, counselors and administrators in two year colleges in New York. The primary objective of that project was to explore the applicability of such information to two year college programming.

The first year of the project was funded under Title III. Twenty-one two-year colleges, public and private, including community colleges, Agricultural & Technical Colleges and Educational Opportunity Centers participated in the project, as did a staff team from the Chancellor's office of the Virginia Community College System. The objective of the first year of the project was to provide cognitive style information and to evaluate the applicability of that information for two-year colleges.

The project included four sequences. The first sequence involved Center staff in identifying information and personnel who could contribute to the project. In coordination with the project's continuing consultant, K. Patricia Cross, a seminar was held to discuss current research on cognitive style and its implications for community colleges. Attending this seminar besides project staff, were leading researchers in cognitive style.

Information from the seminar was provided to project participants and used as a basis for the second phase of the project, a New York colloquium. The colloquium was designed to introduce cognitive style to leaders in New York State two-year colleges and related agencies. Colloquium participants developed a list of concerns and recommendations for New York State two-year colleges based on an analysis of information obtained at the seminar.

The third and major sequence of the project included four workshops for project team members from the twenty-one participating colleges. The first workshop, Recognition, was designed to introduce the concept and to consider the possible implications of cognitive styles for the community college. The second workshop, Assessment, provided participants with the opportunity to use a variety of tests, and introduced other assessment methods. Implementation, the third in the series focused on the variety of ways cognitive style information might be used on campus

and provided a "learning lab" of cognitive style materials. The final workshop, Evaluation, was designed to assist college teams in planning a project for their campus. Through these campus projects participants were able to use the information and materials presented at the workshop to explore the applicability of this informatio for their own campuses.

Campus projects were generally of two types: testing students to determine cognitive style information or planning faculty workshops to introduce this information to others at the college. Results of these projects were reported in the final sequence of the project, the summary activity. In addition to presenting the results of their projects, participants discussed the directions they felt worked with cognitiv style should take in the future and the support they felt was necessary to continue their projects.

For 1975-76 project staff designed a grant proposal for VEA funding which would involve other college personnel and assist college teams in applying this information to vocational programs on their campuses. Although funding was not available until the second semester, eleven of the original twenty-one colleges were able to continue with the project. The objectives for Project Priority: Occupational Emphasis were:

1. To strengthen cognitive style knowledge and application information of participants.
2. To focus the application of cognitive style information to specific occupational instruction and counseling needs of participating colleges.
3. To summarize current information on cognitive style application procedures as related to occupational counseling and instructional programs in the community college.
4. To develop and disseminate materials which will assist in the implementation of cognitive style information in the community college.

Working with the project staff on the 1976 project were team leaders and members from the first year of the project serving as consultants for college teams. These Campus consultants with the project staff identified four questions regarding the application of cognitive style information which they felt were crucial to the two-

year college.

1. Does a program in cognitive style information for students improve learning performance?
2. Is there a relationship between students' cognitive styles and their performance on written assignments?
3. Is there an inverse relationship between mismatching of cognitive style and performance in occupational curriculums?
4. Is cognitive style a determinant in the type of materials students select in a learning laboratory?

The first activity of the project, the workshop, was designed to focus on these questions through the presentation of case studies in these four areas. The case studies were designed by the campus consultants and with necessary modifications could be used in a variety of program areas. Workshop participants were encouraged to adopt one of the cases for their campus or to develop one of their own. Assistance in implementing a "case" will be provided to each college during the consultant visitation phase of the project. The results of all case studies were reported to the Center so that all available information could be summarized and made available to all participating colleges.

The final activity of the project was a three day Summary Activity, designed to share information, conclusions and recommendations regarding the use of cognitive style information in the two-year college.

This report is organized around the Critical Questions Chapters II - V contain the reports on projects designed to investigate the four questions identified in January. Chapter VI contains the results of additional questions identified by participants and staff. In each of these chapters the participants reports are included as submitted to the Center. In some cases attached test data has been omitted particularly where it was lengthy or when it contained student names. Chapter VI, prepared by project staff, reports the procedures and tests used in the study. The final chapter, prepared by Karen Nelson, provides both summary and suggestions for further work.

## Chapter II

### IS COGNITIVE STYLE A DETERMINANT IN THE TYPE OF MATERIALS STUDENTS SELECT?

The projects reported in this chapter reflect faculty's concern with identifying the best resources and instructional options for their students. It was hypothesized in each study that the students' cognitive style would influence the type of materials selected. If this were to prove true faculty would be able to utilize cognitive styles in assisting students in selecting materials. They would also know something about the types of materials selected by students of different styles. This type of information would be extremely valuable in the assessment of current options available to students. It would also be helpful in the design and development of new instructional materials.

The three projects designed to focus on this question were conducted by team members at Cobleskill Agricultural & Technical College. Each worked with students in a different subject; accounting, English and biology. Each focused their study somewhat differently. Ron Hileman tested for field dependence-independence and asked students their preferred way of learning new material. Morgan Desmond, working with students in a composition course organized according to Keller principles, tested for field dependence-independence and systematic-intuitive. In this study students kept a log of the materials used and their styles were compared with the learning modes employed. In Chuck Merrill's project, students enrolled in a multi-media audio-tutorial biology course. Students were identified as either showing unsatisfactory progress on completing early cognitive style test results on field dependence-independence and the McKenney model were used as one determinate in the development of a learning prescription for students who needed a change.

Cobleskill Agricultural & Technical College

Ron Hileman

# FINAL REPORT OF THE CASE STUDY

## Section 1

### Hypothesis

$H_1$: A student's cognitive style will determine the type of material he chooses to use in learning if he is given freedom of choice.

$H_2$: A student who is predominantly field-independent will sample significantly fewer learning options than one who is predominantly field-dependent.

### Questions

$Q_1$: Which methods of instruction were chosen by field-dependent students?

$Q_2$: Which methods of instruction were chosen by field-independent students?

$Q_3$: How many methods were chosen by students who were predominantly field-dependent?

$Q_4$: How many methods were chosen by students who were predominantly field-independent?

$Q_5$: How many students who are predominantly field-dependent met with their instructor?

$Q_6$: How many students who are predominantly field-independent met with their instructor?

## Section II

### Population

The population for this study consisted of 32 Principles of Accounting II students at Cobleskill Agricultural and Technical College. All of the students were majoring in business. There were twelve business administration majors, six data processing, thirteen accounting, and one secretarial science major. All except the secretarial science student were freshmen.

### Procedures

Each student was given the Group Embedded Figures Test (GEFT) in order to measure their degree of Field Independence. Also, each was given a preference questionnaire which was designed to identify their preferred way of learning new material. The questionnaire was a forced choice instrument that dealt with four ways of learning new material: textbooks, sound filmstrips, their instructor, and student tutors. (See Appendix A.)

To start the case study, each student was given an assignment sheet for a new topic in Principles of Accounting II. The topic chosen for the case study was Cost Accumulation Systems. The assignment sheet also listed alternate resources available for learning the material, completing the assignments, and meeting the objectives for the topic. All requirements for class attendance were removed and the student was told he was completely free to choose whichever resources he desired to learn the material from and meet the objectives. They were told they would be tested on the topic at the end of a ten-day period. Following the test on the topic, each student was asked to fill in a reaction form. The form was designed to find out which resources each student used, which one was their primary resource, and what was their general opinion of the case study.

For purposes of analyzing the data, students were grouped according to their scores on the GEFT. Those with high scores (13-18) formed one group and were designated predominantly field-independent. Those with low scores (0-6) formed a second group and were designated predominantly field-dependent. The middle group, with scores from 7-12, were not used in the analysis for testing the hypothesis. The middle group was included in the descriptive statistics.

### Limiting Factors

Because some of the learning resources (options) used in this case study had never been used by some of the students; it is possible that they did not view these options as viable choices.

It is also possible that some of the students did not really understand the intent of the case study. The fact that, for the duration of the case study, the teacher did not meet with them in the classroom was interpreted by some as an indication that the teacher did not want to see them.

Both of these factors probably caused a bias in the data collected.

Section III

Results of Data

TABLE I

This table shows a breakdown of the population by major, sex, and scores on the GEFT.

| GEFT | MAJOR-SEX | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | BA | | DP | | SS | | A | | % |
| | M | F | M | F | M | F | M | F | |
| Field-Dependent (0-6) | 2 | 2 | 1 | | | | 1 | 1 | 21% |
| In-Betweens (7-12) | 1 | 3 | 1 | 2 | | 1 | 2 | 5 | 47% |
| Field-Independent (13-18) | 3 | 1 | 1 | 1 | | | | 4 | 32% |
| TOTALS | 6 | 6 | 3 | 3 | 0 | 1 | 3 | 10 | |

It can be seen that two majors were represented in greater proportion than the other two; (business administration and accounting). Females outnumbered males almost two to one. The breakdown of scores on the GEFT shows a higher proportion of field-dependents and in-betweens. However, in the comparison of field-dependents (F/D) to field-independents (F/I), the population shows a higher proportion of F/I.

TABLE II

This table shows how the students responded on the forced-choice preference questionnaire when asked to rate four ways of learning material. Results are reported only for the F/I and F/D groups.

| | First Choice | | | | Fourth Choice | | | |
|---|---|---|---|---|---|---|---|---|
| | F/I | | F/D | | F/I | | F/D | |
| | No. | % | No. | % | No. | % | No. | % |
| A. Read it from a text | 5 | 50% | 4 | 57% | | | | |
| B. View a sound-filmstrip | 2 | 20% | | | 5 | 50% | 2 | 29% |
| C. Discuss it with a student tutor | 1 | 10% | | | 5 | 50% | 4 | 57% |
| D. Discuss it with my teacher | 2 | 20% | 3 | 43% | | | 1 | 14% |
| | 10 | | 7 | | 10 | | 7 | |

It can be seen that the F/I group was more definite about their last choice while the F/D group was more definite about their first choice.

Forced to choose, fifty percent of the F/I students said they would prefer the textbook while all of the choices were picked at least once. Under the same circumstances, fifty-seven percent of F/D students also chose the textbook, but interestingly, none of them picked the sound-filmstrip or the student tutor. Consistent with the characteristics of a F/D person, more of them picked the instructor.

For their last choice, both groups were about the same in picking the sound-filmstrip and the student tutor.

TABLE III

This table shows that if the in-between group (7-12) is included in the description of their reactions to number six on the forced-choice preference questionnaire, the picture does not change proportionately.

| FIRST CHOICE | | | | | | |
|---|---|---|---|---|---|---|
| | F/I & F/D | | In-Betweens | | Total Population | |
| | No. | % | No. | % | No. | % |
| A. Read it from a text | 9 | 53% | 8 | 58% | 17 | 55% |
| B. View a sound-filmstrip | 2 | 12% | 3 | 21% | 5 | 16% |
| C. Discuss it with a student tutor | 1 | 6% | 0 | 0% | 1 | 3% |
| D. Discuss it with my teacher | 5 | 29% | 3 | 21% | 8 | 26% |
| | 17 | 100% | *14 | 100% | *31 | 100% |

| FOURTH CHOICE | | | | | | |
|---|---|---|---|---|---|---|
| | F/I & F/D | | In-Betweens | | Total Population | |
| | No. | % | No. | % | No. | % |
| A. Read it from a text | 0 | 0% | 2 | 14% | 2 | 7% |
| B. View a sound-filmstrip | 7 | 41% | 2 | 14% | 9 | 29% |
| C. Discuss it with a student tutor | 9 | 53% | 10 | 72% | 19 | 61% |
| D. Discuss it with my teacher | 1 | 6% | 0 | 0% | 1 | 3% |
| | 17 | 100% | *14 | 100% | *31 | 100% |

TABLE IV

This table reports the students responses to items 1 thru 5 on the forced-choice preference questionnaire for the F/I and F/D groups. The Kolmogorov-Smirnov Test* was used to test the goodness of fit. It was used as a substitute for the Chi Square Test because of the small N. The table also reports the results of this test.

| | F/D | | | | F/I | | | | Kolmogorov-Smirnov Test | |
|---|---|---|---|---|---|---|---|---|---|---|
| CHOICES | (A) | | (B) | | (A) | | (B) | | $X^2$ | Sign at .01 level |
| ITEM | No. | % | No. | % | No. | % | No. | % | | |
| #1 | 5 | 71% | 2 | 29% | 8 | 80% | 2 | 20% | .13 | No |
| #2 | 7 | 100% | 0 | 0% | 7 | 70% | 3 | 30% | 1.48 | No |
| #3 | 4 | 57% | 3 | 43% | 3 | 30% | 7 | 70% | 1.20 | No |
| #4 | 5 | 71% | 2 | 29% | 8 | 80% | 2 | 20% | .13 | No |
| #5 | 7 | 100% | 0 | 0% | 7 | 70% | 3 | 30% | 1.48 | No |

On the basis of this data, it is necessary to reject $H_1$. There is no evidence to support the hypothesis that, in this case study, the student's cognitive style determined the type of learning resource he would prefer to use in learning the material.

*Seigel, Sidney; Nonparametric Statistics for the Behavioral Sciences; McGraw-Hill Book Company; 1956. PP.127-136.

TABLES V AND VI

These tables show the resources the students actually chose to use in learning material during the case study.

| Resources | F/I | | | | F/D | | | |
|---|---|---|---|---|---|---|---|---|
| | Resources Used | | Primary Source | | Resources Used | | Primary Source | |
| | No. of Students | % | No. of Students | % | No. of Students | % | No. of Students | % |
| Instructor | 3 | 30% | | | 3 | 43% | | |
| Stu. Tutor | 3 | 30% | | | 3 | 43% | 1 | 14% |
| Textbook | 10 | 100% | 8 | 80% | 7 | 100% | 3 | 43% |
| Programmed Text | 7 | 70% | | | 4 | 57% | 2 | 29% |
| Filmstrip | 8 | 80% | 2 | 20% | 4 | 57% | 1 | 14% |
| | N=10 | | 10 | | N=7 | | 7 | |

| Number of Resources Chosen | Number of Students and Percent | | | | Weighted Average | |
|---|---|---|---|---|---|---|
| | F/I | | F/D | | F/I | F/D |
| 1 | 0 | 0% | 0 | 0% | 0 | 0 |
| 2 | 4 | 40% | 2 | 29% | 8 | 4 |
| 3 | 3 | 30% | 3 | 42% | 9 | 9 |
| 4 | 2 | 20% | 2 | 29% | 8 | 8 |
| 5 | 1 | 10% | 0 | 0% | 5 | 0 |
| TOTAL | 10 | 100% | 7 | 100% | 30 ÷10=3.0 | 21 ÷7=3.0 |

It can be seen from these tables that both groups tried all of the options available. Table V shows that, proportionately, the groups chose resources in about the same manner, while Table VI shows that the groups average exactly the same number of choices. Therefore, $H_2$ is rejected. For this case study, there was no difference between the groups in the number of types of learning resources chosen.

It is interesting to note in Table V that the F/D group was quite a bit more diversified in choosing a primary resource than was the F/I group.

## Section IV

### Conclusions

1. F/I students selected all four options (text, filmstrip, teacher, and tutor) as their first choice on the forced-choice preference questionnaire. (Table II)

2. Field-dependent students selected only two of the four choices (text and teacher) as their first choice on the forced-choice preference questionnaire. (Table II)

3. F/D students, as a group, chose all five of the resource options available to them in the case study. (Table V)

4. F/I students, as a group, chose all five of the resource options available to them in the case study. (Table V)

5. Three out of the seven F/D students (43%) chose to meet with their instructor while working on the case study. (Table V)

6. Three out of the ten F/I students (30%) chose to meet with their instructor while working on the case study. (Table V)

7. There is no evidence to support the hypothesis that, in this case study, the student's cognitive style determined the type of learning resource he would prefer to use in learning the material. (Table IV)

8. For this case study, there was no difference between the groups in the number of types of learning resources chosen. (Table VI)

9. In a forced-choice situation, the F/D group was more definite about their first choice of learning resources while the F/I group was more definite about what their last choice would be. (Table II)

APPENDIX A

PROJECT PRIORITY-PHASE II
Case Study

Preference Questionnaire:

Directions: Circle the letter (a or b) in the response which is most typical of you. You must select one answer to each question.

1. When I have a certain amount of new material to become familiar with:
   a) I prefer to read the material.
   b) I prefer to hear the material from a recording.

2. I find it helpful, when learning material to:
   a) have my teacher explain it to me.
   b) have another student explain it to me.

3. I prefer to learn material:
   a) by myself.
   b) with others.

4. If I want to ask a question of my teacher about the material, I'm learning I:
   a) prefer to do it in class.
   b) prefer to do it in his/her office.

5. When I have to learn some new material, I prefer to:
   a) read it from a text.
   b) read it from a screen.

   Please rank each of these choices from 1 (1st choice) to 4 (last choice).

6. When I have new material to learn, I prefer to:
   _____ a) read it from a text.
   _____ b) view a sound-filmstrip.
   _____ c) discuss it with a student tutor.
   _____ d) discuss it with my teacher.

NAME: _____

APPENDIX B

BA 102

NAME:_____

In studying for Topic G I used the following resources: (please check the one(s) that apply to you)

My Instructor_____

Student Tutors_____

Textbooks_____

The Programmed Text_____

Film Strips_____

REACTIONS AND COMMENTS: (Please tell me what you thought of this experiment)

# PROJECT PRIORITY--OCCUPATION EMPHASIS

Morgan Desmond
State University of New York
Agricultural and Technical College
Cobleskill, New York

Questions: Instructional materials can be categorized by the cognitive style which they serve. Cognitive style is a determinant in the mode of instruction selected by the individual student.

Population: Selected freshman composition students. Most of these students rank near the 85th percentile of their class at Cobleskill in their score on the verbal section of the NYS Regents Scholarship examination. (Selectivity in the sample is irvelevant to the purpose of the study, but inevitable because of extrinsic circumstances.)

Cognitive Styles: Global-articulate. Systematic-intuitive.

Tests used: Group Embedded Figures Test, Following Directions, Scrambled Words.

Format for Study: The students being studied are enrolled in a course which is organized according to Keller principles: students master discrete basic writing skills sequentially by reading theoretical explanations and following practical directions in the textbook, then obtaining evaluation of their work and further (or reiterated) explanations and directions, if necessary, from the instructor in conference. Students have been told to seek peer assistance on an informal basis if they wish.

Each student will be tested for cognitive style. Students will be asked to maintain a log recording learning modes employed.

At the end of the semester, student cognitive styles and uses of learning modes will be compared.

Postulate: The textbook--Janet Abbott, The Whole Thing, (Prentice-Hall, 1974)--is best suited to students with an articulate systematic learning style.

Hypotheses: Students with a relatively systematic learning style will show less recourse to a learning mode other than the textbook than will students with a relatively intuitive learning style.

Students with a relatively global learning style will show, relative to students with a relatively articulate learning style, a preference for social modes of learning (associates, instructor).

Results of Data: The population is too small to draw firm conclusions. In addition, the large deviations warrant caution (for example, in Table A the lowest and second highest ranked consultations--M and D -- differ by only one point in FD score).

However, a number of interesting trends do appear.

Hypothesis #1 When the population is ranked by success on the Following Directions instrument (Table A), the greatest number of consultations occurs in the middle tercile. Thus, the hypothesis that the systematic student would show less recourse to a learning method other than the textbook is borne out, but not to the letter. The correlation is bell-curved, not linear. (Spearman rank correlation of FD score to number of consultations is -.05.) However, the students in the bottom tercile may have simply felt defeated or unmotivated. (Note, for example, that three zero text-uses occur in the bottom tercile but none in the upper two terciles.) The Spearman rank correlation of FD score to number of consultations for the first two terciles is -.77.

The inverse correlation between FD score and text use in the first two terciles seems also to indicate support for the hypothesis (i.e., accomplishment of learning goals with fewer text uses correlates with high FD score because of student-textbook compatibility).

Table B, which ranks the population by success on the Scrambled Words instrument, shows a slight rank correlation between intuitive style and number of consultations (.23). However, both the highest and the lowest number of consultations (1 and 7) occur in both the first and the third terciles.

Hypothesis #2. Table C ranks the population by success on the Group Embedded Figures instrument from most articulate to most global. The rank correlation of success on the GEF to number of consultations is -.16; for the first two terciles only it is -.21. Thus, the data indicate only very slight and inconclusive support for this hypothesis.

Suggestions: Repeat the study with a large enough sample size so that students with an identifiable style can be isolated and their learning behavior studied.

Repeat the study with variations in text and instructor styles studied.

Collect affective data and study correlations with CS.

STATE UNIVERSITY OF NEW YORK
AGRICULTURAL AND TECHNICAL COLLEGE
COBLESKILL, N. Y. 12043

Project Priority

Campus Case Study = Interim Report submitted by Charles W. Merrill
Professor, Biological Sciences

Section I

Question - Does the cognitive style of occupational students determine the type of learning program most effectively used in a Learning Center?

Hypotheses:

1. Occupational student cognitive style is a determinate in selecting a learning program.

2. Occupational students may select a learning program that matches or mismatches their cognitive style.

3. Occupational students identified as field dependent and impulsive are most likely to mismatch cognitive style and learning materials.

4. Occupational students identified as field independent and intuitive succeed with less learning program structure.

5. Occupational students identified as impulsive require a highly structured learning program if they are to succeed.

6. Occupational students' cognitive style is useful as one predictor of the outcome expected from a given learning program.

7. Occupational students' cognitive style is useful when diagnosing learning strengths and weaknesses and prescribing individualized learning.

Section II

Population

The student population (approximately 207) consists of two-year college students majoring in a variety of occupational programs (Agriculture, Business, Food Service, Nursery Education, etc.) and enrolled in a multimedia audio-tutorial biology course that utilizes a highly diversified and flexible set of learning elements that can be configured for each individual student.

Population A consists mainly of students identified as showing unsatisfactory progress by the end of seven weeks during Fall semester 1975. Population B consists mainly of students who completed course requirements early in the semester (Fall 1975). Population C consists of all students enrolled in the course Spring semester 1976.

Procedures

All participants completed the following tests as specified:

HIDDEN FIGURES TEST - Cf - 1

Part 1, 16 Items (3 pages) 10.0 minutes
Scored with a constant of 3

IDENTICAL PICTURES TEST - P-3

Part 1, 3 pages 1.5 minutes

PAPER FOLDING TEST - Vz - 2

Part 1, 2 pages 3.0 minutes
Scored with a constant of 2

SCRAMBLED WORDS - Cv - 1

Part 1, 25 items 5.0 minutes

All tests were scored with accompanying scoring directions. Constants were used as noted to avoid negative scores. The mean and standard deviation was determined for each population and the following "labels" were assigned:

Hidden figures

Field dependent (score equal to or less than M - 1 s.d.)
Field independent (score equal to or more than M + 1 s.d.d)

Identical pictures

Reflective (score = 0 or 1 error)
Impulsive (score = 2 or more errors)

Paper folding

Systematic (score equal to or more than M + 1 s.d.)
Intuitive (score equal to or less than M - 1 s.d.)

Scrambled words

Systematic (score equal to or less than M - 1 s.d.)
Intuitive (score equal to or more than M + 1 s.d.)

Individual students selected a learning program from one of several learning configuration "sets" available in the Learning Center and their program was monitored regularly by the course manager.

Individuals showing marked success or lack of success were regularly interviewed and their individual learning programs identified. The cognitive style test results were then used as one determinate in the development of a learning prescription for students who were diagnosed as needing a change in their learning program. Success of the prescription was determined by any increase in the learner's success in meeting his/her course goals of at least minimum course requirements.

Section III

Results of Data:

"see attached sheets"

Student success indicates that the method has merit. Data has not yet been analyzed to validate this technique as a predictor to develop learning programs prior to class attendance but further efforts are planned.

Section IV

Conclusions:

Cognitive style is one determinate in the choice of a learning program and is a factor in the success of that program for individual occupational students.

Section V

Future projects:

The project will be continued until data are analyzed and conclusions drawn and substantiated or until we give up!



CWM:mm

Implications

While the results of these projects don't provide definite answers to the question they do suggest interesting implications that may merit additional study. In reviewing their work one implication suggested by the team was that cognitive style may be more of a determinate in learning lab perscriptions for students at the extremes. This suggests that another approach to assessing the relationship of student use of materials to cognitive style might be to focus which materials are most helpful in learning. The current projects focus on the materials students prefer or select. Often, especially if students are unfamiliar with some of the options available, selection is a random process. An additional focus which involved students in the evaluation of which materials were <u>most helpful</u> to them and <u>why</u> might yield information helpful in assisting students who are experiencing difficulties in selecting appropriate materials.

This question remains an important one and raises additional related questions. Is it possible, for example, that if we assessed our currently learning options we would find they were designed to be compatible with only one or two styles. If so, what would be the key elements in the design of materials for other styles? Does instructor style influence the selection of materials? What influence does the instructors style have on student success or failure in spite of learning options? Certainly there is much important work to be done in this area.

# Chapter III

## DOES A PROGRAM FOR STUDENTS IN COGNITIVE STYLE INFORMATION IMPROVE LEARNING PERFORMANCE?

The reports presented in this chapter illustrate the importance participants have placed on helping students be aware of their own cognitive styles and the effect styles can have on learning. This in part reflects a realistic appraisal of the time and effort involved in changing or modifying instructional options. While faculty and researchers are busy attempting to determine who learns what best which way, students can use this information to assist in their own success.

In designing projects around this question both Claudia Chiesi and Peter Idleman focused on students with academic difficulties. Claudia Chiesi's study included the assessment of field dependence-independence and the McKenney Model. Peter Idleman used a forced-choice inventory he developed to assess the McKenney Model. The North Country Community College team focused their efforts on students in a PSI psychology class. The systematic nature of the content of the course seemed to lend itself perfectly to information obtained from the systematic-intuitive dimension of the McKenney Model.

Joe Taylor's report is also in this chapter. While it was designed to answer a different question, the content of the report provides an excellent illustration of how an instructor can use cognitive style information to assist students in their learning. In this case the systematic-intuitive dimension was used with freshman composition students.

State University of New York at Buffalo
Educational Opportunity Center at Buffalo

# Project Report

Claudia Chiesi

SECTION I

Question 1: Students who receive cursory information about their cognitive styles show no significant or measureable upgrading in their academic performances.

Question 2: Students who receive information about their cognitive styles and also the information on cognitive strategies along with their instructors perform better academically.

SECTION II

The first part of the project centers on five vocational/technical (occupational) areas of training at the SUNYAB Educational Opportunity Center. The five areas were chosen by agreement with instructors who were willing and able to devote at least two time periods exclusively to the testing batteries and to the reporting of test results. Students were given the option of not participating without academic penalty.

The tests used were: Group Embedded Figures; Scrambled Words, Identical Pictures, Following Directions, Road Signs and the adapted version of the Maria College Inventory.

The project attempted to relate the GEF test to Field Independent and Field Dependent dimensions and the remaining tests related to the McKenney Model.

In part I, 58 students and 1 instructor[1] were tested and the results of those tests were presented to them. Each of the five classes took one class period of an hour and ten minutes to administer the tests and a second class period one week later for the reporting of the results of the tests. The admininstration and reporting of the tests and their attendant results were done by the team leader. Scoring was done by two team members and an EOC secretary assigned to the team leader's unit.

[1] Instructors from the other four training areas had been tested previously as team members in workshops or in mini-workshops held at the EOC. There was no need to repeat their assessment instruments, at this time.

SECTION II cont.

The test were given during the first and second weeks of April, 1976 and the results were returned correspondingly during the second and third weeks of April, 1976.

In May, 1976, during the week of May 5-12, instructors delivered appropriate class grades which had been recorded before and after the orientation/testing and the result/reporting sessions.

Of the number tested, there were 14 males, 42 females, the average age was 27.5 and all students had to qualify as economically and/or educationally disadvantaged in order to be a part of the EOC porgrams generally. 34% of those students tested had a high school diploma, 23% had one to two years of work experience, 2% had an identifiable language problem which they asked to have noted (see data sheets), 9% had no high school diploma, 23% had some post high school academic experience. The female instructor holds the B.S. degree and has fifteen years of work experience, and 7% of the students had work experience only before their EOC program.

Part II of our project included the consultation visit by Dr. Nancy Hoddick which would do two things. Firstly, it would reinforce cognitive style and strategy information to a particular group of students identified for purposes of question 2; and, secondly, Dr. Hoddick would present a mini-historical review and update for some staff members at the EOC who had been on the fringes of the project since October, 1974 but, who would have liked to hear more about what was happening from "an expert". Part II was successful in that students attended the presentation and the limited attendance on the part of the fringe-staff was not controllable.

Part III of the EOC 1976 project was to spread out into other institutions with the news of Project Priority and what the cognitive style movement hoped to do with community colleges and EOCs and some of what its hopes were for the future to expand nationwide. In line with that, the team leader approached the class in Communications Media at Medaille College, a private four year institution. The instructor granted his permission and participated actively by taking and reviewing the assessment instruments with the class and then seeking avenues in which styles and strategies might be helpful to his students.

SECTION II cont.

Secondly, the team leader approached a professor at the State University of New York at Buffalo whose graduate class was reviewing the different innovative techniques, theories and/or thinking of some educators. He welcomed a two part presentation similar to the Medaille College presentation that included a brief historical overview, questions and answers, distribution of the bibliography compiled by Kay Martens, administration of the assessment instruments, a week off to score and review the tests and then another class period to present the results of the tests, answer more questions, give out names of books and literature and the persons from Project Priority who may be able to give better direction to those interested in pursuing the idea. The SUNYAB professor actively participated with the class members in both presentation and review periods.

Part III of the EOC project is recorded with scores on attached pages. It was not an attempt to draw any conclusions since we did not ask any questions. It was an opportunity for an exploratory project and basically it worked as it was intended. The scores are recorded for the Project Priority staff interest.

SECTION III

Results of the data showed that of the 14 students in the Dental Assisting Program in Group I, 7 students answering the Question no. 1, only 1 had higher grades and 6 received lower grades. In Group II, 7 students answering Question no.2 3 showed improved grades, 3 stayed the same and 1 dropped lower.

In the Keypunch program, 5 students were given the assessment instruments. 3 of them dropped out of the course. The other 2 maintained grades that were the same before and after the information, testing and review sessions.

In the Clinical Laboratory program, 11 students were tested and 1 instructor. Of the 11 students, 6 answered Question no. 1 and 5 answered Question no. 2. In Group I, of the six students, 1 dropped out of the program and there were no available post scores, 4 students maintained the same grades before and after and 1 student improved her grades. In Group II, 5 students were identified, 1 dropped out of the program and there were no available post scores, 1 student maintained the same grades and 3 students received lower grades.

SECTION III cont.

In the Secretarial Science program, 9 students were assessed. In Group I for Question no. 1, there were 5 students. Of that 5, 3 maintained the same grades, 1 improved her grades and 1 received lower grades.

In Group II for Question no. 2, there were 4 students. Of that 4, 2 improved their grades, 1 received lower grades and 1 stayed the same.

In Quick Copy Media program, 19 students were assessed. Of that number, there were 10 students in Group I answering Question no. 1, of that number, 2 students improved their grades, 3 had incompletes for the semester, 3 maintained the same grades and 2 received lower grades.

In Group II for Question no. 2, there were 9 students. Of that 9, 2 had incompletes for the semester, 2 earned higher grades, 3 stayed the same and 2 received lower grades.

That is the extent to which we gathered the information and reviewed it and have related it here.

SECTION IV

Observations reveal no significant alteration in the performance of the students involved on the basis of the pre and post grades. There are extenuating circumstances where the degree of difficulty in the program has also increased as the semester moves ahead. Students are more anxious to plan for a new September program and may therefore exert less energy in their present program. There is also the point that the style and strategy business did not have the time to mature, sink in and be developed appropriately with adequate coverage and controls to draw any substantive conclusions from what we have reported. This final statement is the team leader's opinion about the EOC 1976 project.

SECTION V

It has been suggested by a staff member at the EOC that Cognitive Style relates more effectively to teachers, their training and the flexibility of their presentations, i.e. any teacher who can only lecture is not a good teacher.

*MARIA COLLEGE*
*Albany, New York*

*PROJECT PRIORITY REPORT*
*June 1976*

Peter Idleman

*SECTION I*

*Hypothesis*

*The Maria College team chose the following hypothesis: A program of cognitive style assessment, information, and academic counseling will improve the learning performance of freshman students doing substandard academic work.*

*SECTION II*

*Population and Procedures*

*The sample for the study was drawn from a population of students who were identified as having academic difficulty with one or more courses at the mid point of the spring semester. A total of 64 students received academic warnings indicating their work was borderline or failing.*

*A brief written explanation of the study was prepared and delivered to the students. Of the 64 students invited to participate, 34 appeared for the first of four voluntary 50 minute sessions.*

*At the first meeting the purpose of the study was explained and a cognitive style inventory based on the McKenney Model was administered. The inventory was scored and profiles prepared by the students at this session. They were told that the profile and its implications would be explained to them at the next meeting.*

*At the second session 16 students appeared. They were broken into three discussion groups and, with team members as leaders, were given an overview of cognitive style--its definition, uses and implications. Further, each student's profile was explained and some causal relationships were initiated regarding the student's style and the source of his or her academic difficulty.*

*During this two week period all faculty members who taught subjects in which the warnings were issued completed the McKenney Model inventory and had profiles prepared. It was originally intended that the instructor's style might give some clue to the source of the students problems. (As it developed, lack of time and lack of a fully developed strategy for using the instructors' profiles precluded implementation of this aspect of the plan.)*

*Again for the third meeting, the same 16 students appeared. They were divided into two groups and a discussion led by two team members dealt with the specifics of applying cognitive style strategies and techniques for specific courses as they were taught here at Maria. In this session students were given individual prescriptive counseling and some analysis was made of papers and tests.*

*The fourth meeting was scheduled following a two week break to give students time to digest and adopt the information and technique disseminated during the first three sessions. The purpose of the fourth session was to informally inventory the students for the impact and effectiveness of the cognitive style program on their academic work. It was intended that the students would be able to specifically relate how they used the information and understandings which they had acquired to constructively deal with the courses in which they were having difficulty. Unfortunately this last meeting was scheduled immediately prior to the final examination period and this circumstance, abetted by a hot, sultry afternoon, probably was the cause of only two students appearing for the final meeting.*

## *SECTION III*

### *Results of the Data*

*A table reporting the data is attached. Among the 16 students who received the treatment there were 17 subjects in which a D or F grade might have been predicted for an end of course grade. The final grades in the various subjects, however, were:*

*A-1, B-2, C-13, D-9, F-1, W-1. A-B-C grades totaled 16 which is encouraging based on what might have been predicted at mid-term.*

*While the dominent cognitive style appears to be Receptive-Systematic this is probably consistent with the general student population of the college. This is an untested hypothesis and no implications are suggested here.*

*The overall (two or more semesters) cumulative average of the student subjects is reported but these data do not appear to suggest tenable conclusions.*

## *SECTION IV*

### *Conclusions*

*It would be risky to conclude that the treatment given the subjects did assist them significantly to raise their grades. One obvious reason is that the classic control—experimental grouping and treatment*

*was not built into this study. Further, there were a great variety of reasons why the students were doing borderline or failing work. These ranged from (admitted) personality conflicts to (probable) reading deficiencies to (ascribed) sheer laziness. It was intended that the fourth and final session would elicit from the students both concrete and subjective information on the impact of the treatment. Unfortunately these data were not obtained due to the limited attendance.*

*It must be reported, however, that the general impression given by the 16 students who did appear for at least three sessions was one of interest and enthusiasm.*

*An extensive, carefully designed project allowing ample time would probably be well received by students and provide substantive data relative to the effect of a program of cognitive style information. It might be suggested that in such a project both structure and student motivation be build in, thus insuring complete and useable returns.*

## *SECTION V*

### *Suggestions for Future Projects*

*Aside from providing for motivation and structure for the student participants, one general suggestion that comes out of the Maria College study is the realization that extensive, sound, professionally developed materials need to be developed for use by busy faculty members who have neither the time nor expertise to develop such a program and materials. If there is to be consistent usable data obtained for refinement and extension of the "cognitive styles" approach, those colleges who participate in such data collection and materials testing must work from a tightly constructed common base; put another way, if each institution "does its own thing", there is the illusion of constructive, purposeful activity the results of which are basically useless.*

*In closing, no matter what the utility of the quantative findings, the residue from the construct of cognitive style has become a part of many of those persons who have come in contact with it. This, without doubt, has left these individuals more sensitive, more accepting and better skilled to deal with the complexities of ideas and of men and women.*

*June 1976* *Peter J. Killeen*

PROJECT SUMMARY

AWARENESS OF COGNITIVE STYLE AND LEARNING PERFORMANCE

Edward Stodola, Bob Abdo and Don Morgan
North Country Community College

Introduction: We have the basic information. We have an idea of how it describes individual differences. The campus faculty has been given an introduction to these ideas. Now, does this information make a difference to those for whom the college exists - the students?

Following from the above, we designed and conducted a study to assess the affect of cognitive style information on learning performance.

Question Addressed: "Does a program for students in cognitive style information improve learning performance?"

The population for the study consisted of 61 students enrolled in an introductory psychology course that uses a personalized system of instruction (PSI). The population was randomly divided into three sub-groups:

Group A: A control group that received no cognitive style information.

Group B: A experimental group that received an assessment of their own cognitive styles.

Group C: An experimental group that received an assessment of their own cognitive styles along with information about cognitive strategies that are needed for successful performance in the class.

Two hypotheses were tested:

1. Students who receive information about their own cognitive style perform better in an introductory psychology class that uses a personalized system of instruction (PSI) than students who do not receive such information.

2. Students who receive information about their own cognitive style along with information about the cognitive strategies that are needed for successful performance in an introductory psychology class that employs a personalized system of instruction (PSI) perform better than students who do not receive such information.

**Results:** The table below shows final grade information for the three groups. This data suggests

TABLE
FINAL GRADES OBTAINED BY
INTRODUCTORY PSYCHOLOGY STUDENTS

| FINAL GRADE | GROUP A N = 16 | GROUP B N = 18 | GROUP C N = 16 | COMPOSITE [1] N = 50 |
|---|---|---|---|---|
| A | 9 | 8 | 7 | 24 |
| B | 1 | 2 | 2 | 5 |
| C | 2 | 4 | 2 | 8 |
| D | 1 | 0 | 1 | 2 |
| N/C | 3 | 4 | 4 | 11 |
| [2] X G.P.A. | 2.75 | 2.56 | 2.43 | 2.58 |
| S.D. | 1.65 | 1.62 | 1.71 | 1.63 |

[1] Eleven students did not attend the class after the beginning of the 5th week which was when the study began.

[2] Based on a 4.0 system; N/C (no credit) = 0.0 grade points

the conclusion that cognitive style and strategy information reduces learning performance. To trick the reader into an avoidance of the devastating implications of this information, the authors offer the following quotations:

58 YEARS WITH A SLUG IN HIS LUNGS

Paris

A 79 year old former soldier who recently complained to his doctor that he had difficulty in breathing was found with a World War I machine-gun bullet lodged in his right lung, it was learned Saturday.

Marius Warin, of Huby Saint Lew in northern France, was wounded in the first World War battle of Verdun but for 58 years was unaware that the bullet was still in his body.

He was captured by the Germans and treated for his wounds in a German hospital. But the French government has refused to pay him a war disability pension because he could not produce documents to prove he had been wounded.

Agence France-Presse

* * *

A SOLVED PROBLEM IS AS
USEFUL TO A MAN'S MIND AS
A BROKEN SWORD ON A
BATTLEFIELD. - Sufi Proverb

* * *

Difficulties Encountered: The following is a list of difficulties and limitations encountered in conducting this study.

1. Adequate time was not available to analyze the data before writing this report.
2. Final grades alone are not an adequate measure of performance in a PSI course. Additional data are available for further assessment of performance.
3. The information on cognitive style and cognitive strategies was not well integrated into the course; it was rather added on to the course.
4. Because of general faculty interest in cognitive style, a number of the students in all three groups had received exposure to cognitive style information prior to this study.

Additional Questions: The data collected in this study were examined further to seek answers to the questions which follow. The results are reported below.

1. Is there a relationship between size of the systematic-intuitive range and learning performance? No.
   The size of the S-I range was determined by totaling the standard scores (Septiles) on the four assessment tests-scrambled words, verbal puzzles, paper folding and choosing a path. Two measures were used to test for a relationship. The mean of the S-I ranges of students receiving A's in the course (N=14) were compared with the mean S-I ranges of students who did not complete the course (N=7). A significant difference between these means was not found ($\bar{X}_a$ = 16.1, $\bar{X}_{nc}$ = 14.6, t = 5.97, df = 19). The second measure, a correlation of S-I range and total points earned in the course toward the final grade, likewise did not show a significant relationship (r=0.10, t=0.54).

   By totaling the standard scores to determine a S-I range, a uni-polar measure of ability, not cognitive style, is suggested. If this is so,

then ability, as measured by the four tests, was not a significant determinant of successful performance in the class. Keeping in mind that this was a PSI class, these findings are consistent with the notion of mastery learning. This may be important because it lends credibility to the argument that instruction based on mastery can move beyond the problem of ability differences.

2. Does a relationship exist between the systematic-intuitive index and learning performance as measured by total points earned in the course? No. The Systematic-Intuitive Index, S-I Index, is determined by dividing the sum of the standard scores from the two tests for systematic problem solving (paper folding and choosing a path) by the sum of the standard scores from all four tests, the two tests for systematic problem solving plus two tests for intuitive problem solving (Verbal Puzzles and Scrambled Words). Stated briefly, S-I Index = PF + CP/PF + CP + VP + SW. The index is a ratio of the sum of the standard scores from the systematic tests to the sum of the standard scores from all four tests. A high ratio suggests a systematic style while a low ratio suggests an intuitive style.

A correlation of -0.01 was found between S-I index and total points earned. This was not significant (T=0.54, df=27) though in the direction of indicating that the course favored intuitive students slightly. Additional information is provided by comparing the grades of students with a systematic style (SI Index $\geq$ .60, N=3) and with the grades of students with an intuitive style (SI Index $\leq$ .40, N=6). One student from each group did not complete the course while all of the others earned A's. Though these were extremely small samples, the results show that students with an intuitive style can do at least as well as students with a systematic style in a PSI class.

The absence of any indication of a relationship between style and performance in a PSI class is contrary to the common notion of mastery learning that views it as appropriate only for students who are naturally systematic and ordered. It may be true that in at least some situations, mastery learning is most appropriate for students who do not naturally solve problems in an orderly sequential manner.

A look at the cognitive style of the people who provided the instruction in the PSI psychology class is appropriate here. The instructor has an intuitive style and the five class proctors have a mean S-I Index of .38 with a range from .30 to .42. The combined natural style of these six people is therefore intuitive. Yet, they are providing instruction in a mode that requires the use of systematic strategies. This type of mismatch between instructor's style and mode of instruction may be highly desirable. The findings reported above showed that intuitive style students who were mismatched with the PSI systematic mode of instruction performed at least as well as systematic style students who were matched with the systematic instruction. This is perhaps a result of an environment in which both the instructors and students were mismatched to the instructional mode. An assumption that is made here is that PSI is essentially a systematic mode of instruction. This assumption seems fair because the format for the course is consistent with the definition of systematic problem solving.

3. Do differences in cognitive style exist between students who mastered the course and students who did not complete? No.

   The S-I Index means for these groups were almost identical ($\bar{X}_a$= 48.8, $\bar{X}_{nc}$= 49.1). Based on this measure, ones cognitive style is not a significant determinant of success in the course.

Recommendations:

The most important outcome of this study is that it has provided a basis for the recommendations for further study listed below.

1. An information program to give students and proctors an opportunity to develop understandings of their own cognitive styles should be conducted during the first or second week of each semester.
2. Cognitive style assessment should be based on non operationalized problems that are based on the kinds of situations or problems the students will encounter in the course. For example, how would you go about mastering a learning objective that asks you to "List and explain the difference between the three models which attempt to explain schizophrenia?"
3. After the cognitive style information program is completed, counseling that uses cognitive style as a framework should focus on students who are not showing a pattern that will lead to successful course completion. This can be done by identifying and focusing on those students who do not meet course contingencies that come early in the semester (e.g. completion of unit 1 by the end of the second week).

4. The usefulness of cognitive style information in a PSI course should be assessed by looking at rate of course mastery which is indicated by the percentage of students who completed the course. In the past, about 35% of the students who enroll in this course do not complete it. Can this non-completion rate be reduced by focusing on those students who are showing a non completion pattern early in the semester?
5. The Global-Articulated model, and perhaps others, should be added to the information and counseling framework.

Summary & Conclusions:

1. The major hypotheses tested were not made more credible by the results.
2. Relationships were not found between the S-I index and performance.
3. Relationships were not found between the size of the S-I range and performance.
4. Differences in cognitive style were not found between students who mastered the course and those who did not complete it.
5. Further study should focus on ways to reduce the non-completion rate rather than trying to find differences between experimental and control groups.
6. Further study into cognitive style should not attempt to identify principles that apply to all learning situations. Focus should rather be placed at this time on using cognitive style information to improve individual situations that exist where we are.
7. Mastery learning instruction seems to eliminate uni-polar ability factors as significant determinants of successful performance.
8. Students with an intuitive problem solving style seem to perform at least as well as students with a systematic style on systematic tasks when the instructor(s) also has an intuitive style.

Teachers, Teachings, Taught

Teachers talk about teaching.
Real teachers study their pupils as well.
Most of all, teachers should be studied.

Musa Kazim-a Sufi Master

North Country Community College
Saranac Lake, New York
Project Report
Joe Taylor

## SECTION I

### uestions and/or Hypotheses

uestion: Can a knowledge of cognitive style aid an instructor in predicting the cognitive styles which students prefer?
ypothesis: Yes, in most cases
uestion: Can an intuitive instructor of composition develop systematic trategies for systematic students?
ypothesis: Systematic strategies can be developed.

## SECTION II

### opulation and Procedures

here were eighteen students involved in this project. All of them are iberal arts transfer students taking the required English Composition I ourse. There are nine females and nine males. Although the course is esigned for freshmen, this particular section of the course includes welve sophomores and six freshmen. Two of the students are married omen in their late 30's; one male student is 26. This section was chosen because it is the only composition course which I am teaching this emester. I chose the intuitive-systematic dimension because it lends tself to my preferred cognitive style which, in turn, lends itself to he way I teach. The students in the course include science, social cience, theatre, art, and criminal justice majors as well as some "undecideds." After the March workshop, I decided to try to predict the referred cognitive styles of these students. Ed Stodola, team leader, nd Bob Abdo, team member, agreed to help give information to the class nd to test the class. I based my predictions on the results of the reshman Placement Examination (two copies enclosed) and on many essays hich I had read from February to April. I shall supply one example rom Student K, a response to one of the topics on the placement exam. The two teachers who stand out in my mind also happen to contrast reatly in their styles of teaching. My best teacher, a history nut, laced great emphasis on notes, names, and his greatest love of all, ates. My worst teacher was "hooked" on processes and techniques. e would begin all of his classes by giving us a theory, then having us upport that theory with facts in a lab report form. Meanwhile the istory teacher stressed his facts but he emphasized a discussion or ive and take like atmosphere. His classes were exciteing /sic/ and nteresting; the other was dull and repeatative /sic/. . . ." (I ike that word, repeatative.) I related a story about how I had gone bout furnishing three rooms in my apartment. It was, of course, a otally intuitive approach: no budget, several visits to the furniture tore, everything bought in "one fell swoop" with the oversight of a esk lamp, which I purchased later. It did fit the color scheme. I ave an assignment for a class paper on comparison and contrast. I told he class to include an outline, but that the outline was optional. I hen told the class what I had been and was doing; I gave them information about cognitive style in general, then operational definitions f the systematic-intuitive differences. (Two copies enclosed)

## SECTION II

then told them which style I thought they preferred. They told me, sed on the previous information and definitions which style they ought they preferred. Then they were tested after Bob and Ed had pplied further information from psychology textbooks and materials ich they use in the Interdisciplinary Studies (IDS) program to ex- ain the right brain (intuitive) and left brain (systematic) concept. is was in mid-April. Bob and Ed did the testing; Bob compiled the atistics; Bob and I explained the results of the tests. We used rambled Words, Paper Folding, Verbal Puzzles, and Choosing a Path, that order.

## SECTION III

sults of Data

cause Student K liked the "discussion or give-and-take atmosphere" the history class while criticizing the "processes and techniques" the other class, I predicted that the student leaned toward being tuitive. When I made the outline with the paper on comparison and ntrast optional, I thought that the systematics would be the ones o would choose to use an outline and hand it in with the paper. Stu- nt K handed in a detailed outline. In the data which follows, a estion mark indicates that I had some questions about the validity my predictions. As I related the story about furnishing my apart- nt with furniture, rugs, chairs, and drapes, I thought that the stematics in the class would be the ones who would be "Turned Off" the procedure. As it turned out, Student R was the most verbal e in her objections. With these procedures behind us, now see the llowing table which is a compilation of predictions, test, and ecklist results. (Two copies of the checklist are enclosed.)

=Strongly Intuitive MI= Moderately Intuitive -=Middle MS= derately Systematic SS= Strongly Systematic
the tests, a score of .40=SI, .41-.46=MI, .47-.55 =-, .56-.69=MS, 0=SS
the questionnaires, 12-13 b=SI, 7-11 b=MI, 5-7 a or b= -, 7-11 a= 12-13 a=SS

| dent | My Prediction | Student's Prediction | Test | Questionnaire |
|---|---|---|---|---|
| A | I | I? | .47- | MI |
| B | S | S | .25SI | - |
| C | I | I | .20SI | SI |
| D | I | I? | .47- | MI |
| E | I? | S? | .47- | SS |
| F | S? | S? | .31SI | MI |
| G | I? | S? | .44MI | SI |
| H | I | I | .43MI | - |
| I | S | S | .46MI | MS |
| J | I | I? | .50- | SI |
| K | I? | S | .67MS | MI |
| L | I | S | .60MS | - |
| M | S | I | .64MS | - |
| N | I | I | .50- | SI |
| O | S | I | .75SS | SI |
| P | S? | S? | .53- | - |
| Q | S | S | .55- | - |
| R | S | S | .78SS | MS |

SECTION III

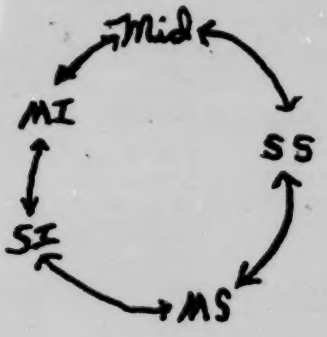
he data demonstrates that an instructor who has knowledge about cog-
itive styles can generally tell which cognitive style the student pre-
ers.
he second question is more difficult to answer, mostly because it is
ifficult to summarize all of the activities inside an English compo-
ition classroom where the knowledge of cognitive styles is one of many
imensions. A table of data is difficult to translate into how to
eal with reading an essay, with giving a writing assignment, or with
eading and writing about King Lear. However, there has been a "give-
nd-take" discussion between the class and me about matters such as how
o approach the matter or reading and writing assignments more sys-
ematically. Although I have a concrete schedule for a semester, I do
ot write out and copy the schedule for class distribution. To follow
uch an outline would be stifling, especially to the intuitives. What
now do is to write on the blackboard the schedule for two weeks at a
ime. It is good that the systematics have "forced" me to do this.
he intuitives find this approach a good compromise between two extremes.
n fact, I find that writing on the blackboard is something which is
ighly desirable to systematics.
he class and I, especially the systematics, talk about topics for
riting, especially those topics which can be attacked systematically.
or example, I now give a "prescription" class paper of definition,
paper which appeals highly to systematics. The systematics and I
hen try to work out strategies for the intuitives, who are initially
pposed to such writing. The home paper then becomes a matter of
arious topics which will appeal to both.
s was indicated previously, we now talk more about outlining as a
trategy for organizing. Based on a concrete example about Generals
ee and Grant, the class and I discussed several ways to organize a
aper of comparison and contrast. The outlines which could be followed
ere immediately discernible to the systematics. What happened here
as that the intuitives discovered that, given this systematic approach,
heir thinking could be organized in ways which they
adn't thought possible at first. Almost all of the intuitives found
hat writing the paper was easier after the various ways of organizing
ere explained.
ntuitive instructors can develop systematic strategies for systematic
tudents. My suggestion is that, once you know who they are, you ask
hem for their ideas about how to approach some given problem(s). Then
isten to what they say!
he piece of additional information: Once students are given information
nd definitions, they do quite well at predicting their preferred style.
our observations: Student O begins by solving problems intuitively.
he final results are almost always the product of a "typical" syste-
atic.
tudent R has adopted the most obvious strategies in trying to deal with
e. Communication between the two of us has improved vastly over the
ourse of the semester. Systematic students can develop strategies
o deal with intuitive instructors.
hen giving results of tests, do not write the data on the board, or on
aper, in the "old" way: .70=SS
.56-.59=MS
.47-.55=Mid
.41-.46=MI
.40-. =SI

Why? It looks like A B C D F or Best Worst or Top Bottom

Here are two better ways:

SI----------MI----------Middle----------MS----------SS

or




Why? These demonstrate the continuum concept of cognitive styles.

Finally, Bob, Ed, and I agree that having people who are mismatched dispense information, give and explain tests, and, in general, do a "team" kind of approach, is ideal because students get to see people with different styles use those styles while "teaching."

SECTION IV

Conclusions

- An instructor who has knowledge about cognitive style can generally tell which cognitive style individual students prefer before the students are tested.
- An intuitive instructor can develop teaching strategies for systematic students.
- If they are given enough information and complete definitions, students can generally predict their cognitive styles before they are tested.
- Systematic students can aid intuitive instructors in developing systematic strategies.
- There are ways to present cognitive style data so that it demonstrates the continuum, value-free concept of one's preferred cognitive style.

## SECTION IV

- People with mismatched cognitive styles make a good team to dispense cognitive style information, to give tests, and to discuss the results of the tests.

## SECTION V

uggestions for Future Projects

- Can systematic and intuitive composition teachers compile a textbook for SUNY community colleges which reflects strategies from both styles in solving difficulties which mismatched instructors and students may have?
- Can two mismatched instructors compile such a textbook for their particular college?
- Which kinds of problems in the composition classroom are best solved intuitively? systematically?
- Which kinds of problems are systematics most likely to have with any given humanities course? How can they be solved?
- Which kinds of problems are intuitives most likely to have with any given science course? How can they be solved?
- What are further strategies which I can develop, as a strongly intuitive instructor, for systematic students? for "middle" students?

COMMUNICATIONS DEPARTMENT

OF

NORTH COUNTRY COMMUNITY COLLEGE

FRESHMAN PLACEMENT EXAMINATION

Time: 80 Minutes. Allow 40 minutes each for I and II

I. Select one of the following topics. Write a clear, well organized paragraph.

A. If I had three wishes.

B. My favorite high school course was _____ because

C. Changes I've Gone Through In Life.

D. My Best/Worst High School Teacher.

E. My Most Frightening Experience.

II. Read the following paragraph. Note that it is developed by point by point (alternating) contrast. Select one of the subsequent topics and write your own point by point contrast paragraph.

My two friends are as different as two people could possibly be. Don, the music lover, detests the noisy clamor of a basketball game, but yells himself hoarse at a football game. Jake, the ardent debator, revels in the hot, noisy basketball game, but is bored with football. Silent unless he has something worthwhile to say, Don is a direct contrast to Jake, who never stops talking long enough to examine what has been said. Whereas Don would rather spend an evening in the library reading, Jake prefers a hot rod race. Both are respected members of the freshman class: Don, for his ability to get things done without fanfare; Jake, for all the fanfare he creates by winning debates for the college. The very contrast between the two is the reason that I have them for friends. If I want a quiet evening, I choose Don, if I want a noisy evening, I choose Jake.

Topics:

A. Two of my teachers
B. My Two Brothers
C. My Two Sisters
D. Two Pop Singers
E. My Brother and Sister
F. Two Adults I know
G. My Two Friends

## COGNITIVE STYLES

Cognitive style is one's preferred manner of taking in information, processing information, and solving problems.

### Systematic-Intuitive Differences

| Systematic (Left Hemisphere) | Intuitive (Right Hemisphere) |
|---|---|
| 1. Carefully define the limitations of the problem. | 1. Define the problem frequently while solving it. |
| 2. Develop a method or a plan for solving the problem. | 2. The method results from trial and error while solving the problem. |
| 3. Rely on clear information or reason. | 3. Rely on hunches or what "feels right." |
| 4. Solve the problem by consciously following a step-by-step approach. | 4. Jump back and forth from one step to another. |
| 5. A good plan leads to a good solution. | 5. The solution is good because it solves the problem. |
| 6. Major concern: Method of solving the problem. (Right answer not needed) | 6. Major concern: Solution of the problem. (Right answer is needed) |

For each of the following, please check the statement (a or b) which best describes or is most characteristic of how you approach and solve problems. Be sure to check one statement for each of the 13 items.

When given a problem to solve:

1.____ a) I first develop a logical method for finding a solution and then proceed to solve it.
____ b) I start to solve it as soon as I understand it, without carefully developing a method.

2.____ a) I use a step-by-step method.

____ b) I use a trial and error method.

3.____ a) I remain very conscious of my approach.

____ b) I look for outside clues and hunches which may help me.

4.____ a) I look for one specific method and plan my approach from that.
____ b) I consider a number of methods at the same time.

5.____ a) I apply each step, test it, discard it, and proceed to the next step.
____ b) I skip steps and return to a previous step in solving the problem.

6.____ a) I concentrate mainly on my method.

____ b) I concentrate mainly on the overall problem.

7.____ a) I defend my solution in terms of the method I used.

____ b) I defend my solution because it felt right or seemed to fit the problem.

8.____ a) I carefully define the specifics of a problem first and then begin to solve it.
____ b) I define and redefine the problem as I am solving it.

9.____ a) I remain on the approach that I developed while solving the problem.
____ b) I change my approach while solving the problem.

0.____ a) I am mainly concerned about the method I use.

____ b) I am mainly concerned about getting a good solution.

1.____ a) My notes for each subject are kept together in an orderly system.
____ b) My notes are kept in different places or are "at home somewhere".

y study desk looks like:

____ a) the shelves of NCCC library

____ b) River Street lounge after a beer blast

hen going away for a weekend, I

____ a) Have a detailed schedule and follow it.

____ b) Take off with a general plan and change it according to

Implications

The results of these studies seem to indicate that cognitive style information has little impact on improving student performance. Possibly that is true. Possibly the studies themselves are not able to truly assess the question. These studies, more than the others, suffered from the time constraints. Students were well into the semester before they began. Often the time involved in setting them up, testing and returning those tests left little time for the development of strategies or the use of those strategies. Peter Idleman's study is perhaps an example of this. While students were enthusiastic about the information it was late in the semester and other factors must have seemed more pressing. Such studies repeated over a full semester or a year might provide more positive results. The responses of Joe Taylor's students would seem to indicate that this is a possibility.

The important information which is unfortunately missing from three of these reports, due to the design of the reporting procedures is the actual program of information provided to students. If work is to continue on this question, it would seem that participants would benefit from sharing the procedures and methods they use in presenting information and strategies. Certainly much in this area can be gained from Joe Taylor's report.

Another potentially interesting piece of information is student reactions. Did they perceive the information as helpful? What use did they make of it? What strategies did they develop for themselves and how successful were they?

Chapter IV

## IS THERE AN INVERSE RELATIONSHIP BETWEEN MISMATCHING OF STYLE AND PERFORMANCE IN OCCUPATIONAL CURRICULUMS?

The two reports presented in this chapter focus on the general question of whether certain fields or curricular areas are more compatible with (match) a particular cognitive style. While data is available to show that matches or preferences for certain majors occur in four-year college students of differing styles little information is available on two-year college students. Sankar Sastri's study provides a needed look at the matching-mismatching of students and major in an engineering technology program. In this study he focuses on the relationship of field dependence-independence to grade point average.

The Ulster County Community College team has taken a different approach to the question of matching. In this case the question of instructor-student match is the focus. Their study has been designed as a long-range project. Cognitive styles were not assessed during the phase described here.

TWO-YEAR COLLEGE DEVELOPMENT CENTER
State University of New York at Albany

Project Priority
Occupational Curriculum

Sankar Sastri

New York City Community College
Brooklyn, New York 11201

Question Is there a relationship between QPA (quality point average) and hidden figures test?

Population The group comprised of 38 first and fourth semester engineering technology students in engineering technology curriculum.

Cognitive Styles: Field dependence-independence was measured using hidden figures test.

Procedures for Study: 38 students enrolled in engineering technology curriculum were given hidden figures test in the beginning of the semester. The range in hidden figures test was between 2 and 32. At the end of the semester their quality point average was correlated to the hidden figures test score. The range in quality point average was between 0 and 4.

Postulate: On cognitive style field independence-dependence measures the relative analytical approach of an individual by use of Hidden Figures Test (Educational Testing Service, Princeton, N.J.). The task is to locate a simple geometric figure within a more complex design. A high score on the test indicates analytical ability, that is the ability to discrete (field independence) where as a low score indicates a more global approach (field dependence).

As a group, relatively field independent people are likely to favor academic subjects such as mathematics and science were analytical competence is called for and subsequently enter careers in physics, mathematics engineering and the sciences. On the other hand, relatively field dependent individuals prefer courses such as English, History, Social Sciences and Humanities often leading to careers in teaching social science, social work and counseling. Frequently these people are undecided about their careers and do change majors in college (Witkin 1974). In social situations field dependent people feel more comfortable, are affected by praise and as a result take cues from their peers and are apt to remember faces easily (Witkin 1974). As for instructional method field independent students generally prefer lecture method and working alone. Field independent teachers prefer the lecture method and when asking questions use subject matter questions more frequently than field dependent instructors. On the other hand, field dependent teachers prefer discussion method as a technique and use more hand gestures (Freedman, O'Hanlon, Oltman and Witkin, 1969).

In academic performance, for example among students who chose the natural sciences and mathematics domains, those who are more field independent tend to do better than those who are less field independent (Hunt & Radhwa 1973). Student nurses who did well in psychiatry tended to be field dependent where as student nurses who did well in surgery were relatively field independent.

(Witkin 1974). Practicing architects selected as outstandingly creative by their peers were markedly field independent whereas writers similarly selected were quite field dependent (McKinnon 1961).

From the above findings, field independent students should do well in engineering technology program.

Results of the Data: The results as shown in Table I indicate that students with high hidden figures score also have high QPA confirming the findings of Witkin that field independent students do perform well in the field independent curriculum. Using a normal distribution for a population of 38 students the curriculum coefficient was found to be 0.36 significant at .05 level.

Conclusion: Field independent students perform well in engineering technology curriculum. Field dependents enrolled in field independent curriculums should be informed about their cognitive styles and also about how and in which situations they learn best to enable them to make more suitable decisions about academic courses and career choices and once the choice is made they can improve their academic performance.

Suggestions for Future Studies:

1) Repeat the study with a larger sample.
2) Divide the courses in engineering technology curriculum into two fields - one FD and the other FI and see whether FD students perform well in FD courses.
3) Use cognitive strategies to improve the performance of FD students in engineering technology.

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2. Hunt, D. & Randhwa, B.S. Relationship between and among cognitive variables and achievement in computational science. Educational and Psychology Measurement, 1973, 33, 921-928.

3. McKinnon, D.W. The personality correlates of creativity. A study of American Architects. Paper presented at the meeting of 14th International Congress of Applied Psychology 1961.

4. Witkin, H.A. The role of cognitive style in academic performance and in teacher-student relations. Paper presented at symposium on "Cognitive Styles, Creativity and Higher Education," sponsored by the Graduate Record Examination Board Montreal, Canada, November, 1973. Research Bulletin 73-11 Princeton, N.J. Educational Testing Service, 1973

HF Scores and QPA

Range of HF Test = -2 to 32

Range of QPA = 0 to 4

| HF | QPA |
|---|---|
| 6 | 1.68 |
| 14 | 2.33 |
| 8 | 3.5 |
| 18 | 2.85 |
| 9 | 2.56 |
| 7 | 2.13 |
| 12 | 2.97 |
| 16 | 3.27 |
| 14 | 2.61 |
| 14 | 3.86 |
| 14 | 3.1 |
| 0 | 3.88 |
| 10 | 3.33 |
| 10 | 3.92 |
| 18 | 3.84 |
| 12 | 3.45 |
| 5 | 2.84 |
| 4.9 | .63 |
| 12 | 1.75 |
| 20 | 3.8 |
| 21 | 3.8 |
| 10 | 1.8 |
| 11 | 2.5 |

| HF | QPA |
|---|---|
| 16 | 2.5 |
| 1 | 3 |
| 5 | .66 |
| 4 | 2.11 |
| 11 | .95 |
| 7 | 3 |
| 4 | 2.46 |
| 11 | 2.66 |
| 9 | .6 |
| 0 | 2.88 |
| 3 | 1.9 |
| 4 | 1.54 |
| 6 | 2.83 |
| 6 | 2.5 |
| 2 | 2.2 |

Ulster County Community College

Cognitive Style Project

Team Members - John Hjelmeland, Robert Markes, James Canniff, Al Duane, Lou Cesaratto, Joe Keefe, Barbara Connelly, Roxanne Bell

Our team project consisted of two surveys: (1) A Survey of Student Course/Instructor Selection, and (2) A Survey of Student Expectations of Instructor's Teaching Style(s).

The use of questionnaires to conduct surveys among students was determined to be an appropriate starting point by our team. We felt that the data collected would aid in the examination of individual differences. Specifically, whether or not the majority of students surveyed would be indicating an attempt on their part to match their perceived learning preferences with an instructor they perceived to have similar learning/ teaching preferences.

The team designed two questionnaires. The first was designed to investigate the reason(s) why students selected specific course sections and instructor. The second was designed to investigate student perceptions of the instructor's teaching style(s). The second survey was conducted at the beginning of the semester to examine student expectations and again at the end of the semester to examine changes in perception after the completion of the course.

It was hypothesized that the majority of students surveyed would indicate their primary reason for their selection of a specific course section was based on a preference of time and/or convenience rather than a preference for a specific instructor.

It was further hypothesized that the majority of students who perceived their learning style to be matched with a specific instructor of their choice at the beginning of the semester would indicate less of a match existing by the end of the semester.

Three departments volunteered to conduct the survey among their students. Multiple sections of English, History and Psychology classes were selected.

Four hundred and fifty-nine students responded to the questionnaire. On the first survey, 47.6% of the students gave reasons of time and/or convenience as the primary factor for selecting the specific course section and instructor. 43.4% of the students gave reasons related to the instructor's style of presentation as their primary factor for selecting the specific course section and instructor. 9% of the students gave reasons other than time, convenience or instructor preference as the primary factor for selecting the specific course section and instructor.

Of the 43.4% of the students who attempted to match their learning preference with instructor preferences, the majority of them did seek assistance in making their decision. In order of frequency, students sought advice from advisors, friends, and faculty. Less than 15% relied on their own analysis of the various instructors to determine the one best matched with their learning preferences.

The data from the second survey are still being examined by the team members. It appears from the responses of the 459 students who completed the second questionnaire that more than 50% who perceived they were matched with the appropriate instructor at the beginning of the course indicated less of a match with the instructors style at the end of the semester.

In both surveys the results supports our hypotheses. The data provides an indication that several students do attempt to match their learning preferences with an instructor who is perceived to be compatible in style. Further, the data suggests that most students who attempted to match lacked adequate information on which to determine the instructor who would match best with their learning preferences.

Finally, the data suggests that students do place importance on individual difference, and that matching learning preferences with instructors style of teaching may enhance their learning experiences.

Some recommendations:

One recommendation that might improve the students' attempt to match more accurately their learning preferences with an instructor who has similar learning/teaching preferences, would be to conduct small group workshops prior to registration periods on cognitive styles. Further, to have information available for the students on the instructors' perceptions of how they teach their courses. (this would be voluntary on the part of instructors).

Another recommendation that might aid students, would be to have advisors involved in workshops on cognitive styles to increase their awareness and understanding of individual differences.

Last 4 Digits of
Soc. Sec. No.

___ ___ ___ ___

STUDENT COURSE SELECTION SURVEY

COURSE TITLE:
SECTION NUMBER:
GRADE YOU EXPECT TO RECEIVE IN THIS COURSE:

GENERAL DIRECTIONS: Answer either option A or option B below. Do not attempt to answer both options.

Option A.
Choose this option if you selected this section or instructor because someone suggested that you take it. (put an X in the appropriate space below.)

Was the suggestion made by:
___faculty member, ____advisor, ____friend, ____other.

How important were the reasons listed below in determining which section of the course you selected?

If more than one reason is appropriate, place the number (1) in the space to the left of the reason which is the most significant factor in your decision. Then place a number (2) to the left of the next most significant reason. Then continue numbering 3, 4, 5 etc. to the left of each reason you feel influenced your decision to enroll in this section.

I am enrolled in this section of this course for the following reason(s):

___(a). It was the best time available to suit my schedule.

___(b). It was the only section available when I registered for this course.

___(c). I was led to believe that this section or instructor would be the most stimulating.

___(d). I was led to believe that this section or instructor would be the least demanding.

___(e). I was led to believe that this section or instructor would be most suitable for me.

___(f). Other. (Please write the reason in the space below.)

STUDENT COURSE SELECTION SURVEY

Option B.

Choose this option if you selected this course without either seeking or being given assistance. (Either you were not given advice or you decided to disregard the advice you were given.)

How important were the reasons listed below in determining which section of the course you selected?

If more than one reason is appropriate, place the number (1) in the space to the left of the reason which is the most significant factor in your decision. Then place a number (2) to the left of the next most significant reason. Then continue numbering 3, 4, 5 etc. to the left of each reason you feel influenced your decision to enroll in this section.

I am enrolled in this section of this course for the following reason(s):

____(a). It was the best time available to suit my schedule.

____(b). It was the only section available when I registered for this course.

____(c). I felt that this section or instructor would be most stimulating.

____(d). I felt that this section or instructor would be least demanding.

____(e). I felt that this section or instructor would be most suitable for me.

____(f). I had a course with this instructor before.

____(g). Other. (Please write the reason below).

Last 4 Digits of
Soc. Sec. No.

____ ____ ____ ____

STUDENT EXPECTATION SURVEY

COURSE TITLE:
SECTION NUMBER:

Examine the list of "typical" classroom activities given below. On the basis of what you know or have heard about this course and section, rank each activity according to how often you expect the activities to occur. Indicate whether you expect the activity to occur: never, a couple of times during the semester, once a week, almost every class, every class session.

1. Never
2. A couple of times during the semester.
3. Once a week.
4. Almost every class.
5. Every class session.
6. Don't know/no opinion.

PLEASE CHECK APPROPRIATE SPACES BELOW:

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Formal lecture presentation. | ___ | ___ | ___ | ___ | ___ | ___ |
| 2. General class discussion. | ___ | ___ | ___ | ___ | ___ | ___ |
| 3. Instructor use of visual aids other than blackboard (overhead projector, motion picture projector, audio tape, television). | ___ | ___ | ___ | ___ | ___ | ___ |
| 4. Student presentation of oral reports. | ___ | ___ | ___ | ___ | ___ | ___ |
| 5. Small group discussion. | ___ | ___ | ___ | ___ | ___ | ___ |
| 6. Individual student-instructor conferences. | ___ | ___ | ___ | ___ | ___ | ___ |
| 7. Use of programmed texts. | ___ | ___ | ___ | ___ | ___ | ___ |
| 8. Independent textbook reading. | ___ | ___ | ___ | ___ | ___ | ___ |
| 9. Laboratory type experimentation, observation and reporting. | ___ | ___ | ___ | ___ | ___ | ___ |
| 10. Student-generated written reports. | ___ | ___ | ___ | ___ | ___ | ___ |
| 11. Objective quizzes (tests) -- multiple choice, fill-in, true-false, matching. | ___ | ___ | ___ | ___ | ___ | ___ |
| 12. Essay tests and essay quizzes. | ___ | ___ | ___ | ___ | ___ | ___ |
| 13. Instruction in specific skills ("how-to") | ___ | ___ | ___ | ___ | ___ | ___ |

| | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| 14. | Instruction on general theory (ideas & concepts) | ___ | ___ | ___ | ___ | ___ | ___ |
| 15. | Instruction on many aspects in general (broad treatment) | ___ | ___ | ___ | ___ | ___ | ___ |
| 16. | Instruction on selected aspects in detail (narrow treatment) | ___ | ___ | ___ | ___ | ___ | ___ |
| 17. | Use of problem solving approaches | ___ | ___ | ___ | ___ | ___ | ___ |
| 18. | Use of drill (practice) | ___ | ___ | ___ | ___ | ___ | ___ |
| 19. | Use of comparison-contrast | ___ | ___ | ___ | ___ | ___ | ___ |
| 20. | Instructor selection & assignment of specific student tasks | ___ | ___ | ___ | ___ | ___ | ___ |
| 21. | Student selection of specific assignments & tasks | ___ | ___ | ___ | ___ | ___ | ___ |
| 22. | Other (please specify) _____ | ___ | ___ | ___ | ___ | ___ | ___ |

_____

_____

_____

Last 4 Digits of
Soc. Sec. No.

STUDENT FOLLOW-UP SURVEY ___ ___ ___ ___

COURSE TITLE:
SECTION NUMBER:

Examine the list of "typical" classroom activities given below. On the basis of what you know or have heard about this course and section, rank each activity according to how often you expect the activities to occur. Indicate whether you expect the activity to occur: never, a couple of times during the semester, once a week, almost every class, every class session.

1. Never
2. A couple of times during the semester.
3. Once a week.
4. Almost every class.
5. Every class session.
6. Don't know/no opinion.

PLEASE CHECK APPROPRIATE SPACES BELOW:

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Formal lecture presentation. | ___ | ___ | ___ | ___ | ___ | ___ |
| 2. General class discussion. | ___ | ___ | ___ | ___ | ___ | ___ |
| 3. Instructor use of visual aids other than blackboard (overhead projector, motion picture projector, audio tape, television). | ___ | ___ | ___ | ___ | ___ | ___ |
| 4. Student presentation of oral reports. | ___ | ___ | ___ | ___ | ___ | ___ |
| 5. Small group discussion. | ___ | ___ | ___ | ___ | ___ | ___ |
| 6. Individual student-instructor conferences. | ___ | ___ | ___ | ___ | ___ | ___ |
| 7. Use of programmed texts. | ___ | ___ | ___ | ___ | ___ | ___ |
| 8. Independent textbook reading. | ___ | ___ | ___ | ___ | ___ | ___ |
| 9. Laboratory type experimentation, observation and reporting. | ___ | ___ | ___ | ___ | ___ | ___ |
| 10. Student-generated written reports. | ___ | ___ | ___ | ___ | ___ | ___ |
| 11. Objective quizzes (tests) -- multiple choice, fill-in, true-false, matching. | ___ | ___ | ___ | ___ | ___ | ___ |
| 12. Essay tests and essay quizzes. | ___ | ___ | ___ | ___ | ___ | ___ |
| 13. Instruction in specific skills ("how-to") | ___ | ___ | ___ | ___ | ___ | ___ |

| | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| 14. | Instruction on general theory (ideas & concepts) | ___ | ___ | ___ | ___ | ___ | ___ |
| 15. | Instruction on many aspects in general (broad treatment) | ___ | ___ | ___ | ___ | ___ | ___ |
| 16. | Instruction on selected aspects in detail (narrow treatment) | ___ | ___ | ___ | ___ | ___ | ___ |
| 17. | Use of problem solving approaches | ___ | ___ | ___ | ___ | ___ | ___ |
| 18. | Use of drill (practice) | ___ | ___ | ___ | ___ | ___ | ___ |
| 19. | Use of comparison-contrast | ___ | ___ | ___ | ___ | ___ | ___ |
| 20. | Instructor selection & assignment of specific student tasks | ___ | ___ | ___ | ___ | ___ | ___ |
| 21. | Student selection of specific assignments & tasks | ___ | ___ | ___ | ___ | ___ | ___ |
| 22. | Other (please specify) _____ | ___ | ___ | ___ | ___ | ___ | ___ |

_____

_____

_____

Implications

Although these projects were of very different types they both provide interesting information. Sankar Sastri's data indicates that field independent students perform well in the engineering technology curriculum on his campus. It would be interesting to know if this finding will be replicated on other campuses. It would also be valuable to know if the same relationship exists in other occupational curriculums. It may well be that whole areas on divisions within the community college are more compatible with one or more particular cognitive styles. The implications of such a finding reach into attrition, failure and a multitude of existing problems. Certainly further research is needed in this area.

The Ulster team project is an excellent example of a teams planned effort to focus on instructional concerns. In this way they are able to involve interested faculty and students. They seem to also have beautifully set the stage for the introduction of cognitive style. It may be possible through their approach to interest faculty in projects assessing the effects of instructor-student matches and mismatches.

Chapter V

## IS THERE A RELATIONSHIP BETWEEN STUDENTS COGNITIVE STYLES AND THEIR PERFORMANCE ON WRITTEN ASSIGNMENTS?

The two studies presented in this chapter address a critical concern in the community college, the improvement of writing skills. They are perhaps more complex to administer than many of the studies reported in this volumn. They required the testing of large numbers of students, instructor grading of special writing assignments and use of computer time in data analysis.

Their presentation and analysis is strengthened in that the Genesee Community College project is a direct out growth of Herb Zagarow's effort. The design for Herb Zagarow's project, which was begun in the fall of 1975, was presented at the March Project Priority:Occupational Emphasis Workshop. The idea intrigued Genesee's Team leader and he asked Herb Zagarow to serve as Genesee Community College's campus consultant and present the idea to the Team and the Humanities Division. As a result an extensive project was developed by the team and implemented in the summer.

In addition to looking at English skills, the Genesee Community College study also attempted to determine if cognitive style tests correlate with other college predictors of academic success.

The McKenney model and field dependence-independence were used in both studies.

PROJECT PRIORITY

REPORT OF CAMPUS PROJECT

SUFFOLK COUNTY COMMUNITY COLLEGE

DR. HERBERT W. ZAGAROW

DIRECTOR OF PSYCHOLOGICAL & HEALTH SERVICES

## HYPOTHESIS

The research study at Suffolk County Community College sought to investigate whether a relationship exists between cognitive style and writing ability for freshmen students. The specific null hypotheses to be tested were:

1. With writing ability factored out, there is no significant difference in level of writing performance for systematic and intuitive students when both are asked to write systematically.

2. With writing ability factored out, there is no significant difference in level of writing performance for systematic and intuitive students when both are asked to write intuitively.

3. There is no significant difference in the ratings on writing assignments received by intuitive and systematic students when both are evaluated by a systematic rater.

4. There is no significant difference in the ratings on writing assignments received by intuitive and systematic students when both are evaluated by an intuitive rater.

5. There is no significant difference in the number of systematic and intuitive students at Suffolk County Community College.

## PROCEDURES

In order to obtain a writing sample, students in each of twelve English composition classes were asked to write on the topic, "Advertising". To assess how congruence of student style and style in which one is asked to write affects writing performance, randomly, half the students were asked to write systematically while the others were

asked to write intuitively. This was accomplished by having the students receiving the systematic treatment write an outline before doing their assignment, while the intuitive group was asked to write their compositions off the top of their head.

Cognitive style data was acquired by administering the following instruments:

1. Hidden Figures
2. Choosing a Path
3. Scrambled Words
4. Verbal Puzzles
5. Paper Folding

RESULTS

Analysis of the data has not yet been completed. Tables one, two and three do contain the raw score information collected from the mapping of 228 students. As will be observed in the tables, the total N varies from test to test. This is due to the fact student absences from class prevented full collection of mapping data.

A complete analysis of the data, in the terms of the hypothesis to be tested, will be ready for presentation at the June workshop.

CONCLUSIONS

Not to be drawn until full analysis of the data has been completed.

IMPLICATIONS FOR FURTHER RESEARCH

This study will be replicated at Suffolk County Community College next year. Also to be investigated is the relationship between cognitive style and performance on creative and expository writing tasks.

## ADDENDUM

### RESULTS

An analysis of variance was used to test the first four hypotheses. Results of this procedure indicated that none of the null hypotheses could be rejected. In every case, the effort to relate cognitive style to writing performance did not produce significant differences among the various groups of students.

The mean and standard deviation were calculated for the instruments that were administered. Looking specifically at the hidden figures test, a mean score of 7.5 and standard deviation of 7.5 was found. Table 1 also reveals that almost all of the students (89%) achieved a raw score of 13 or less.

### CONCLUSIONS

Based upon an analysis of the data, a relationship was not found to exist between cognitive style and writing ability for freshmen students. It is hypothosized that one reason for these results was the scewed distribution of the test scores. Because most of the scores on the hidden figures test hovered around the basement of the continuum, the possibility for a significant difference among the populations was diminished. With this in mind, it is concluded that this study should be replicated next year with a larger number of students so that a more heterogeneous population can be secured.

As a result of the depressed scores on the hidden figures test, a preliminary judgement was made that a significant number of students at Suffolk County Community College lean toward an intuitive cognitive mode. Since this judgement is not based upon statistically significant findings, this hypothesis will be more rigorously investigated next year.

# THE CORRELATIVE AND PREDICTIVE NATURE OF SELECTIVE COGNITIVE STYLE TEST BATTERIES

Dave Kingsley
Donna Walsh
John Dahlberg
Gisela Hoffman
Toni Dempster

Summer, 1976

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OVERVIEW

A variety of innovations are being introduced at the Two-Year College level in New York State. One such recent investigation is to diagnose the cognitive styles of the non-traditional student. With a decrease in the traditional eighteen year old entering population, and a commensurate admission of greater numbers of "non-traditional" students, it seems incumbent on us to investigate and evaluate cognitive processes and variations in learning styles so that we might know more about tailoring our instruction and guidance to the needs of what Pat Cross calls the "New Student."

This summer, a team of five members of the Genesee Community College staff conducted a pilot study during the first summer session to test certain hypotheses about our students. The team members represented the Math-Science, Humanities, and Intermediate Studies Divisions. Donna Walsh of the Student Services Staff also assisted with this study by providing testing and data retrieval services.

A sample group of ninety-seven summer school students, enrolled in the June 1 to July 2 Session, completed all the test instruments. Five cognitive style test instruments were used to identify a student as Field Independent or Field Dependent, Intuitive, Systematic, Preceptive, and Receptive. A sixth instrument the vocabulary exercise,was used primarily to identify the motivational level of each student. In addition each student wrote a writing sample. The scores of the various test batteries were compared with the student's individual unit and total writing sample score, high school average whenever available, and the

English ACT and Composite ACT scores.

Our overall objective was to see if there was any relationship between certain aspects of a student's cognitive style and his/her writing ability. An objective grading routine, based on some of the concepts in a study conducted by a California State University group[1] was used by two English instructors. Each used a similar grading routine to evaluate, numerically, a writing sample. The cognitive style test batteries were selected from a list suggested by the Two Year College Center's Project Priority Staff.

Cognitive abilities differ from aptitude and personality inventory exercises. Traditionally, we have measured intelligence and vocational aptitudes to help our students make the right career choices. Cognitive abilities, on the other hand, indicate how a person perceives and processes information about his or her environment. In other words, a person's style is basically how he or she interacts with the environment. Increased knowledge about cognitive learning patterns may help faculty make the right teaching choices and therefore initiate more effective learning.

One of the major premises tested this summer was that our students need a traditional instructional format, since they are Field Dependent, Receptive, and Impulsive. If this premise could be confirmed, we might match cognitive styles with teaching strategies in order to accomodate the dominant cognitive patterns. This idea emanates from the fundamental questions: (1) Can we become more effective as instructors if we are aware of our students' differences?, and (2) Would this awareness positively affect our retention rate and the success of our overall mission?

---

[1]Edward M. White, Comparison and Contrast: The California State University and College Freshman English Equivalency Examination, 1973 and 1974.

A proposal for a Summer Research Grant was submitted to the Dean of Instruction for his review with the Dean's Council. (See Appendices A and B) The project was funded and the testing, scoring and student feedback was completed during the first two weeks of the first Summer Session. Correlative and predictive studies were carried out using the scores from the cognitive style exercises, the scores of the writing sample and those available from the student's file.

This final report includes the original proposal and an outline of the chronological events of the research proceedings. The hypotheses tested are evaluated and suggestions, observations and shortcomings are explained. The suggestions focus upon problems encountered in the area of student data and admissions, and there are suggestions for the general college community with implications for further study.

GENERAL PURPOSES OF RESEARCH

The above project was undertaken to determine if cognitive style tests correlate with known predictors of academic success (such as the ACT tests), thereby serving as possible alternatives to the ACT tests in the placement of students. A writing sample from each student was also analyzed to serve as a predictor of student achievement in English skills and to determine if the cognitive tests are indicative of a student's level in these skills.

DESCRIPTION OF SAMPLE

The sample consisted of ninety-seven students who were encouraged to participate by instructors of five classes of the first summer session, 1976. The students were given a battery of tests described below and their records were checked for ACT scores, high school average, and curriculum. Because the sample was drawn from students participating in a summer session, rather than a regular semester, the results cannot be interpreted as predictive of scores of the general student body. Nonetheless, they can be used to solidify and clarify present concepts, as well as to suggest further routes of study. Also, because many statistical tests were run on the same sample, no positive conclusions can be drawn from seemingly significant statistical results of the research, and should only be used in identifying factors for further study.

DESCRIPTION OF SCORES AND TESTS GIVEN EACH SUBJECT

The cognitive styles of students were determined by four short tests.[2] Later, the Impulsive Index was derived from the Identical Pictures Test. A listing and general description of the five scores, plus others, follows:

1. SYMBOLS-This scores measures the preceptivity of a person. "Preceptive individuals tend to use concepts and categories to code data. They look for relationships between stimuli so that they can efficiently catalogue information."[3]

---

[2]Copies of these tests are on file in the Office of the Dean of Instruction, Genesee Community College.

[3]Karen Nelson, "Introduction to Cognitive Style," not published, October, 1974, p. 3.

2. IDENTICAL PICTURES-This score measures the receptivity of a person. "Receptive individuals are more sensitive to the stimulus itself. They focus on detail rather than relationships and try to derive the attributes of the stimuli from direct examination instead of fitting it to their precepts."[4]

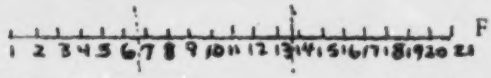
3. FOLLOWING DIRECTIONS-This score measures how systematic the student is. "Systematic individuals tend to approach a problem by devising a method or plan with specific, sequential steps to solution."[5]

4. SCRAMBLED WORDS-This score measures intuitivity. "Intuitive individuals more often consider solutions using trial-and-error, defining or redefining the problem, moving back to a solution and so on."[6]

5. IMPULSIVE INDEX-This measures the degree of impulsiveness in a student. It is derived from the Identical Pictures test by counting the number of incorrect choices made.

6. EMBEDDED FIGURES-In addition to the other tests, this test was administered to measure the Field Dependent/Independent tendencies of the student. A high score on the Embedded Figures Test (14-21) indicates that the student is Field Independent, while a low score (0-6) indicates a Field Dependent student.[7]

EMBEDDED FIGURES TEST (1-21)

Field Dependent  Field Independent

7. VOCABULARY TEST-This is a short test designed to indicate a person's current level of academic achievement.

8.-13. WRITING SAMPLE-This gave scores, to each student in spelling/grammar, sentence structure, paragraphing, organization, and content. The scores of each were also totaled, for a sixth score. This test was designed to test a student's writing ability in a contained situation. The question (See Appendix C) was designed to allow any individual to respond , as it relied on a person's experience. Also, careful attention was paid to the wording so that no one would be discriminated against or handicapped by extraordinary language. Concepts from Comparison and Contrast (see above) guided the construction and evaluation of the question.

14.-18. OTHER FACTORS: Curriculum of the Student
Sex
ACT (English) } This is a 3 hour preadmission test.
ACT (Composite) }
High School Average

---

[4]Nelson, p.3.

[5]Nelson, pp. 3-4.

[6]Nelson, p. 4.

[7]K. Patricia Cross, Accent on Learning, (Washington: Jossie-Bass Publishers, 1976), p. 119.

TESTING DIRECTIONS (See Appendix D)

SCORING METHODS

Cognitive Style Instruments

Symbols-Count all symbols (not words) that were used only once in each example.

Identical Pictures-Count all the correct answers minus 1/4 x number wrong.

Following Directions-Count all the correct answers minus 1/4 x number wrong.

Scrambled Words-Count all the correct words.

Impulsive Index-Count number of incorrect choices on Identical Pictures Test.

Embedded Figures-Count all correct answers (exact lines).

Vocabulary-Count all correct answers.

The scores were then placed on a scale of 0-20 for all tests except the embedded figures (scale of 0-18), and the vocabulary (scale of 0-48).

Writing Sample Scoring

Spelling/Grammar-0-7 mistakes per 250 words was considered acceptable (6-4 pts.) Eight or more mistakes seemed to intrude on the meaning and was considered unacceptable (3-1 pts.).

Sentences-Students were evaluated on their ability to write in complete, clear sentences. One serious sentence error was minimally acceptable in a 250 word page. Attention was also paid to the variety displayed in sentences.

Paragraphs-Each paragraph was evaluated to determine that all sentences, within a given paragraph, contributed to the main point of the paragraph.

Organization-Acceptable performance contained clear logical movement from one idea to the next, some clear statement of the main point, and a statement that concluded or summarized the paper.

Content-Papers needed to contain a clear idea and purpose throughout. Students needed to say something specific and definitive.

Each factor was assigned a maximum of six points in order to determine a clear distinction between an acceptable performance (6-4) and an unacceptable performance (3-1). Within this structure, 20 points was an overall acceptable performance.

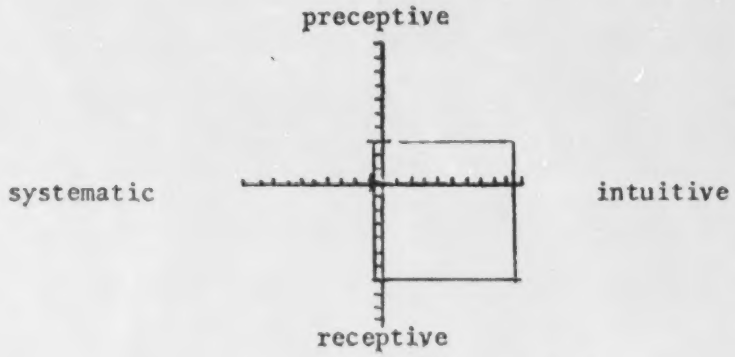
The factors involved in evaluation of the writing samples were chosen on a rather arbitrary basis. They were weighted on the mechanical side in an attempt to maintain as objective an analysis as possible. It was felt that a variety of

instructors might disagree with the emphasis on individual factors but that an acceptable overall evaluation could be achieved using these five factors.

Tests were scored by members of the faculty team, as above, recorded, and compiled. Students received feedback, as to their individual results on all instruments, in large group sessions lasting about twenty minutes. A student feedback sheet was used (See Appendix E) and general descriptions and information for interpreting individual results were given. An additional, individual session was offered by a counselor to help students further investigate their results.

DISCUSSION OF STATISTICAL OUTCOMES

As expected it was found that the students were more receptive (70%) than preceptive (30%), and more intuitive (94%) than systematic (6%). A general cognitive map of the student body represented in the sample is given here:




Even though the above prediction of cognitive styles proved true, there seemed to be no significant correlation between the cognitive styles of students and their English skills or ACT scores. A few notable exceptions are discussed below.

While the cognitive tests, in general, did not predict the ACT scores and English skills of the students, other tests did. The vocabulary test seemed to do a masterful job predicting both ACT scores. The scores for Following Directions and the Impulsive Index also correlated highly with the ACT scores. Both the Vocabulary and the Following Directions Test are also the best choices for

further studies in factors predicting English writing skills.

The High School Average scores were found to correlate somewhat (r=.36, $\alpha$=.03) with the English skills of the students, but this should certainly be tested further before it is used as a reliable index of placement into English classes. The English ACT score, if available, would be much more reliable in this regard (r=.61).

The curriculum chosen by the student seemed to make little difference in the English writing scores nor in the Field Dependent/Independent tendencies. The science majors did differ significantly from non-science majors in preceptivity (they were more preceptive and less receptive than non-science majors), but in all other cognitive styles there were no significant differences.

SPECIFIC HYPOTHESES TESTED

1. There is a correlation between writing skills and one's cognitive style.

Results: Correlation study between cognitive indices and English factors.

| Cognitive Factors | English Factors: Vocabulary | Spelling | Sentences | Paragraphing | Organization | Content | English Total |
|---|---|---|---|---|---|---|---|
| Identical Pictures (Receptive) | .09 | .06 | .02 | .03 | -.18 | -.21 | -.07 |
| Symbols (Preceptive) | .21 | .07 | .15 | .09 | .11 | .02 | .09 |
| Scrambled Words (Intuitive) | .19 | .47 | .26 | .26 | .22 | .14 | .39 |
| Following Directions (Systematic) | .24 | .40 | .26 | .39 | .28 | .20 | .42 |
| Impulsive Index (Impulsiveness) | -.18 | -.24 | -.17 | -.17 | -.28 | -.16 | -.25 |

Reject the Hypothesis

2. Cognitive styles are predictive of academic success in English.

Results: Multiple regression study of the cognitive styles with the writing sample total score.found no statistical difference.

| | Simple R |
|---|---|
| Following Directions | .42 |
| Scrambled Words | .39 |

3. A greater proportion of the non-random sample will test to be Field Dependent, Intuitive, and Receptive. (Most of our students aspire toward the Humanities/ Social Science Curricula)

Results:

Field Dependent (range 0-6)

Field Independent (range 14-21)
(Mean-10.37 Standard Deviation-5.43)

| | |
|---|---|
| Receptive | 68 |
| Preceptive | 29 |
| Intuitive | 91 |
| Systematic | 6 |

Reject the Hypothesis [Note: Although a greater percentage of our sample tested Field Dependent rather than Field Independent, the largest group fell in the middle range with no apparent inclination to either extreme (according to the guidelines established for evaluating the Embedded Figures Test). It should be pointed out, however, that the Receptive and Intuitive figures seem significant and worthy of further study.]

4. Students testing high on Field Independent test battery will have a high writing composition total score. (The converse of this hypothesis will also be true)
Results:

| Correlation .01 | Correlation .15 | Correlation .08 |
|---|---|---|
| High EMB (Field Ind.) S= | Mid EMB S= .153 | Low EMB (Field Dep.) S= .339 |
| N= 31 | N= 37 | N= 29 |

Reject the Hypothesis

5. Science majors will have different patterns of cognitive styles than non-science majors.

Results: Science and non-science majors had no statistical significant difference on the Embedded Figures Test.

| Science | Non-science |
|---|---|
| N=24 | N=73 |
| 9.76 | 10.57 |

Reject the Hypothesis

DISCUSSION OF NON-STATISTICAL OUTCOMES

1. Each instructor of record will be encouraged to participate in the testing and interpretation of the results. Thus, they will become more aware of the variations of styles of themselves and their students.

Results:

Of the five instructors whose students participated in this research project, all were encouraged to participate in the testing. One was a member of the project team and had taken the test batteries prior to this time. Only one instructor took the total battery of test instruments. All instructors were present and participated in the interpretation of the results of the testing. Active questioning and class discussions which ensued, confirmed their increased awareness of the variations of styles of learning.

2. The results of the pilot study will be presented to interested faculty members at the Fall Workshop in August. This will further an understanding of the nature of cognitive styles of our student body.

Results:

A brief one-page summary will be placed in the faculty mail boxes before the fall workshop. An allocation of time for a brief presentation,made by the panel of research participants, will be provided by the Dean of Instruction.

3. A need for better diagnostic and retrieval systems for student data will be more apparent.

Results:

The diagnostic instruments the school now uses for placement in English and math sections are the ACT, High School Averages, and English and math scores. The ACT is a test that takes three hours to complete and the resulting scores measure achievement in math, English, and reading. All scores are used for placement in entering English and math classes, intermediate studies classes and/or total program, and cut-off scores for entrance in the Nursing Program.

Students that have transferred, enter as part time, or who have been out of high school for over two years, or are over twenty-one, are not required to take the ACT. As our mean age of entering student increases, fewer students are required to take this instrument.

The retrieval of the ACT scores and High School Averages of approximately 100 students, took, on an average, one minute per student. Of the folders consulted

1. 15% of the sample had both English and Composite ACT acores, and the High School Average.
2. .01% had only the ACT scores.
3. 15% had only the High School Average.
4. 70% had neither score records.

These results may only reflect our unusual student clientele during the summer sessions.

4. Inadequacy of the current pre-admission routines will become evident.

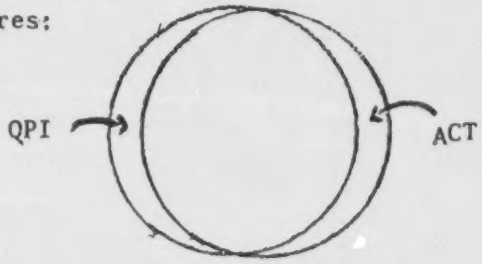
Results:

Of the approximately 100 subjects used for the study, 60% had folders that were in our files, and 40% had no folder available. Retrieval results are listed above in result #3.

DISCUSSION OF FUTURE RESEARCH

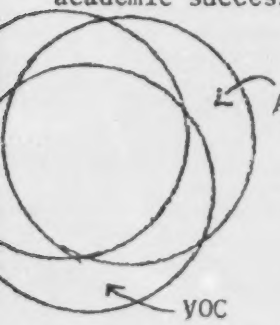
At the present time the college is using four predictors of academic success (English ACT, Composite ACT, SAT, and High School Average), all of

which are cumbersome or impossible to obtain, as is decisively pointed out in another part of this report. If the ACT scores are valid predictors of success (most colleges use them for admittance and placement of students) and if a QPI (Quality Point Index) is the score measuring success, we can expect a high correlation between the two scores:

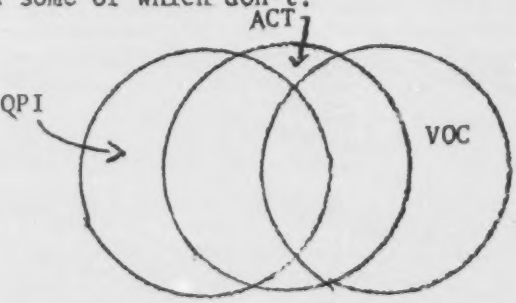



One of the main purposes of this study was to obtain factors correlating with the ACT scores and hopefully correlating with the QPI.

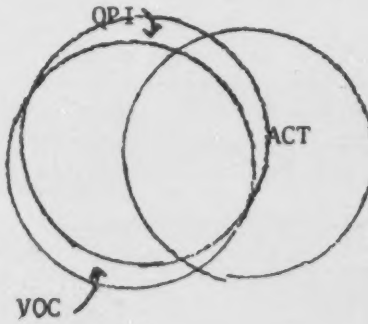
As an example of the use and misuse of the data of the study, it was found that the vocabulary score correlated highly with the English ACT score. This cannot, however, be interpreted to mean that the short vocabulary test is a good predictor of QPI. A high correlation between vocabulary and English ACT could be illustrated by Venn Diagrams in several ways, some of which predict academic success and some of which don't.




Vocabulary is as good a predictor of QPI as is ACT.




Vocabulary is a poor predictor of QPI




Vocabulary is a better predictor of QPI than is ACT

The principles illustrated in the above diagrams may help the reader understand possible relationships of factors which need further study.

It is strongly encouraged that the college authorize a larger and more extensive study in the near future, using a sample from the regular student body (including QPI's, ACT's, and High School averages). This could test to see if ACT scores do predict QPI's adequately or if in fact, some of the simpler and shorter tests described here do an equal or better job of placement of students. Specifically, the answers to the following questions could be useful to the college:

1. Is the composite ACT score a valid predictor of QPI for our students?

2. Is the English ACT score a valid predictor of a student's success in the English Sequence?

3. Is the vocabulary test a valid predictor of the QPI?

4. Is a combination of scores such as Vocabulary, Following Directions, Impulsive Index and High School Average a good predictor of student success as measured by the QPI?

5. Is a score on a writing sample a good predictor of success in our English courses, as measured by the English grades?

6. Is a score on a writing sample a good predictor of general academic success, measured by QPI?

7. Can other cognitive tests diagnose and/or predict potential writing deficiencies?

8. How can the development and utilization of new teaching strategies complement learning variations?

9. Are the factors of Impulsivity, Receptivity, and Categorization good indices of academic success, as has been suggested by E.T.S.?

10. Do students select faculty with compatible styles?

APPENDIX A

May 10, 1976

MEMO TO: Dean Brause

FROM: David Kingsley

Re: Proposal for Cognitive Style Summer Grant

This is an initial request for funding of a Cognitive Style pilot study to be carried out during this Summer Semester.

The following outline of events are suggested:

1. Obtain a writing sample from summer school attendants designed by members of the Humanities Division under the direction of John Dalhberg.

2. Administer six Cognitive Style Test batteries to students taking humanities, psychology, and biology courses during the first summer semester. (Donna Walsh, Dave Kingsley)

3. Score writing samples and Cognitive Style exercises. (John Dalhberg and Toni Dempster), (Dave Kingsley, and Donna Walsh)

4. Tabulate scores and obtain high school averages, ACT scores and QPI's from student files (Donna Walsh)

5. Key punch data for SPSS routines Multiple Regression, Correlation studies (Work study Key punch operator) (Dave Kingsley and Gisela Hoffman supervise)

6. Interpret Cognitive profile with students. (Team: John, Donna, Dave, and Toni).

7. Program, run, and evaluate SPSS Data. (Dave Kingsley and Gisela Hoffman).

8. Interpret the data gathered. (Team)

9. Write a narrative for fall faculty workshop explaining the significance of the Pilot Study. (John, Toni, and Dave)

10. Present findings to interested faculty during workshop.

11. Propose continuation of study with a larger sample before the Commencement of the fall semester.

dq
cc David Kingsley
Donna Walsh
John Dalhberg
Toni Dempster

APPENDIX B

June 3, 1976

MEMO TO: Dean Brause

FROM: David Kingsley

RE: Research Project: The Correlative and Predictive Nature of Selective Cognitive Style Test Batteries.

A pilot study will be conducted this summer to determine selected cognitive styles of a non-random sample of community college students. A writing sample will be requested from each participant together with a test battery of six exercises. The writing sample will be correlated with the various cognitive test batteries (5). Along with these samples, students records will be reviewed for ACT scores, high school averages and other relevant data. This information will be used in a multiple regression study as predictors of cognitive style - English composition interdependencies.

Summer Research Grant Proposal

A team of five staff members will carry out a research project on the preferred cognitive styles of a sample of approximately 100 students registered in the summer session.

Question: Is there a relationship between a student's cognitive style and his performance on English composition assignments?

Research Design:

Approximately six sections of summer school participants will be given a battery of five cognitive style exercises to complete. They will also be requested to submit a writing sample for the study. The instructors involved in the study are those teaching English, Psychology, Sociology, and Microbiology.

100 students - a. Writing Sample
b. Test Batteries

| | | | |
|---|---|---|---|
| 1) | Identical Pictures | - 1 1/2 1 1/2 | Receptive |
| 2) | Symbols | - 10 min. | Preceptive |
| 3) | Scrambled words | - 10 min. | Intuitive |
| 4) | Following Directions | - 15 min. | Systematic |
| 5) | Group Embedded | - 20 min. | Field Dependent/ Independent |

Hypothesis:

1. There is a correlation between writing skills and one's cognitive style.
2. Cognitive styles are predictive of academic success in English (High School average, ACT scores).
3. A greater portion of the non-random sample will test to be Field Dependent, Intuitive, and Receptive. (Most of our student body aspire toward the humanities/social science curricula).
4. Students testing high on Field Independent test battery will have a high writing composition total score. (The converse of this hypothesis will also be true.)
5. Science majors will have different patterns of cognitive styles than non-science majors.

Assumptions:

1. Students will be motivated to perform well on these test batteries since they will be gaining some insights into their preferred learning styles.
2. The vocabulary exercise will identify low student motivation levels and facilitate the elimination of questionable data.
3. Testing fatigue will not be a factor because of the short duration of each exercise.
4. The testing environment is conducive for good results.
5. The sex, time of day used in testing, and maturity level of each student will not bias the test results.

Expected Outcomes:

1. Each instructor of record will be encouraged to participate in the testing and interpretation of the results. Thus they will become more aware of the variations of styles of themselves and their students.
2. Furthermore, the results of the pilot study will be presented to interested faculty members at the fall workshop in August. This will further an understanding of the nature of cognitive styles of our student body.

Expected Outcomes:

3. A need for better diagnostic and retrieval systems student data will be more apparent.

4. Inadequacy of current pre-admission routines will become evident.

5. Alternatives to pre-admission testing routines will be evaluated.

6. Diagnostic and predictive cognitive style exercises will be developed to identify potential writing difficulties.

7. Faculty and counseling staff will become more knowledgeable about the variations of learning styles of our students so that we can modify the counseling, teaching environment to meet a broad spectrum of students' needs.

8. New teaching strategies will be studied and attempted to complement learning variations.

9. Staff will be encouraged to participate in a continual investigation into the cognitive styles of our students throughout the fall semester. Four hundred copies of tests are available for this purpose.

APPENDIX C

English Writing Sample

Name_____

Social Security #_____

It is common to hear that people are a "product of their environment." This statement often is used to explain a number of actions and thoughts, but it often does have some truth as we react in terms of our past. Describe in detail, one aspect of your past environment that has influenced your life: a person, an activity, a trip, a book, a possession. Once you have clearly described this, explain completely why and/or how it has had a significant influence.

APPENDIX D

Directions for the First Test Session

I'm working on an Instructional Research Project for the school, and would like your co-operation in taking afew testing instruments. The results will be available to you personally, in a week or so, and will be kept confidential. The results will have no influence on your grade in this class.

There will be 2 instruments given today. The first one will take approximately 20 minutes.

GEFT Directions Materials; stop-watch, test booklets, pencils

Distribute test booklets and pencils.

"Fill in the information on the cover page."
"Now start reading the Directions, which include 2 practice problems for you to do. When you get to the end of the Directions on page 3, please stop. DO NOT go beyond page 3."
Proctor circulates the room making sure subjects are doing the 2 practice problems correctly and they do not go on past page 3. When all have finished,
"Before I give the signal to start, let me review the points to keep in mind." Read the statements at the bottom of page 3, stressing the necessity for tracing all lines of the Simple Form, including the inner lines of the cube, simple form 'E', as well as for erasing all incorrect lines.
"Are there any questions about the directions?"
Pause to allow questions.
"Raise your hand if you need a new pencil during the test."
"When I give the signal, turn the page and start the First Section. You will have 2 minutes for the 7 problems in the First Section. Stop when you reach the end of this section. Go ahead."
Proctor circulates and times.
After 2 minutes,
"STOP. Whether you have finished or not. When I give the signal, turn the page and start the Second Section. You will have 5 minutes for the 9 problems in the Second Section. You may not finish all of them, but work as quickly and accurately as you can. Raise your hand if you need a new pencil during the test. Ready, go ahead."
After 5 minutes,
"STOP. Whether you have finished or not. When I give the signal, turn the page and start the Third Section. You will have 5 minutes for the 9 problems in the Third Section. Raise your hand if you need a new pencil during the test. Ready, go ahead."
After 5 minutes,
"STOP. Whether you have finished or not. Please close your test booklets."
Collect all booklets and pencils.

from Manual, by Witkin, Oitman, Raskin, and Karp, 1971

Writing Sample

The next instrument is an English Writing Sample. Please fill in the information on the top of the white page. Read the directions and write your response on the yellow paper. You may write your S.S.# on the yellow paper instead of your name. If you need more paper, raise your hand. You have 40 minutes to complete this instrument. (People were allowed to leave when finished.)

APPENDIX E

STUDENT'S COGNITIVE PROFILE

Section _____ Curriculum Cole _____ Name _____
June 1976 Soc. Sec. _____

| | | | COGNITIVE INSTRUMENT | |
|---|---|---|---|---|
| Spelling and Mechanics<br>Do they have command of grammar and spelling? | _____ | _____ | Identical Pictures<br>Receptive - | _____ |
| Sentence Structure<br>Can the students write in complete sentences? Are the sentences clear and smooth? | _____ | _____ | Symbols<br>Preceptive - | _____ |
| Paragraphing<br>Do all the sentences within a paragraph contribute to one main idea? | _____ | _____ | Scrambled Words<br>Intuitive - | _____ |
| Organization<br>How are ideas linked? Are there clear relationships established between ideas? | _____ | _____ | Following Directions<br>Systematic - | _____ |
| Content<br>Has the student related the ideas clearly? Has the idea been effectively supported? | _____ | _____ | Group Embedded Figures<br>Field Dependence/Field Independence | _____ |
| WRITING TOTAL | _____ | | VOCABULARY TEST | _____ |
| Sample Writing Ave. | _____ | | Sample Vocabulary Ave. | _____ |

Directions for the Second Day of Testing

Today you will take 5 short test instruments. They are designed to identify ways that you function in respect to learning. There are different ways we all learn, some better than others. All these learning styles are different, some are easier than others, so some tests will be easier than others for you. When we interpret the results of these instruments, you will know more about your own individual style of learning.

Test Order

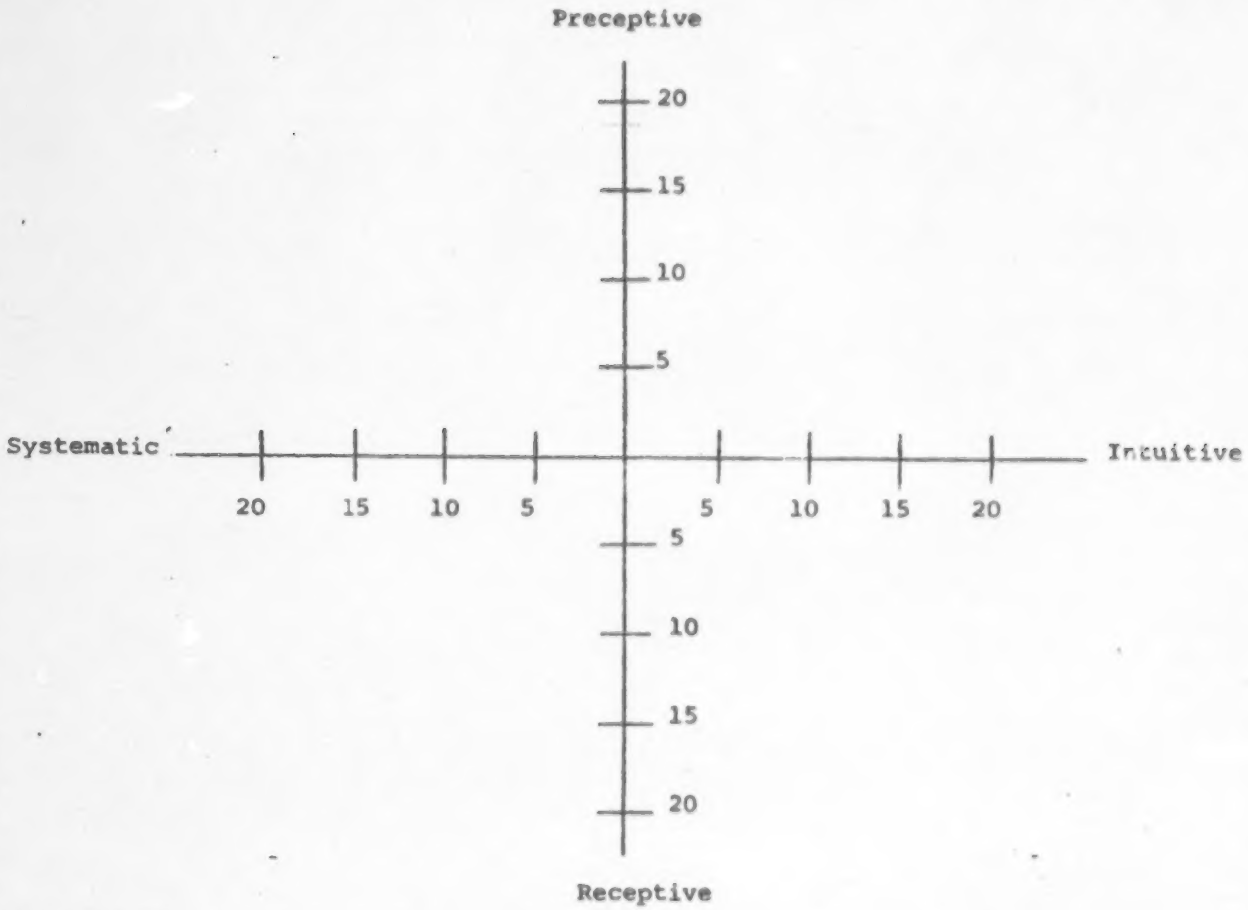
1. Scrambled Words
2. Following Directions
3. Vocabulary
4. Identical Pictures
5. Symbols

Directions for each instrument

Place your name at the top of the paper. Read the first page and look up when you are finished. Any Questions? You may begin.

(Time each instrument, as shown on the first page of the instrument.) Collect after finished, and pass out the next instrument.

STUDENT'S COGNITIVE MAP



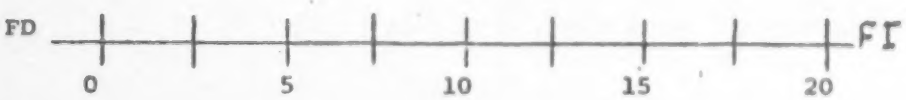

Interpretation: _____

_____

_____

Field Dependent/Independent

Sample average is _____




Interpretation: _____



_____

_____

SELECTED BIBLIOGRAPHY

Cross, K. Patricia. Accent On Learning. Washington: Jossie-Bass Publishers. 1976.

Nelson, Kare "Introduction to Cognitive Style." October 9, 1974.

White, Edward M. Comparison and Contrast: The California State University and College Freshman English Equivalency Examination. 1973.

White, Edward M. Comparison and Contrast: The California State University and College Freshman English Equivalency Examination. 1974.

Implications

It is at best disappointing to find no relationship between the cognitive style measures and writing. Perhaps there is none and other approaches to writing problems must be utilized. However, Joe Taylor's report (see Chapter III) seems to suggest their may be. If student's can use cognitive style information to assist each other in improving their writing, cognitive style could seem to be related to writing in some way.

Perhaps what is needed is an alternative way of looking at the evaluation of the written assignments. In both of these studies faculty were asked to grade the written assignments on rather traditional criteria such as grammar, sentence structure etc. Joe Taylor's students seem to be suggesting that cognitive influences their approach to a particular type of writing assignment. There may be other influences that are not suggested by the reports in this volumn. Unfortunately, even though the question is critical we seem to have fewer "good leads" on the direction to take in obtaining any answers.

# Chapter VI

## COGNITIVE STYLE AND CAREER CHOICE

The Monroe Community College team decided to focus their study on the relationship of cognitive style to career choice. There is considerable presidence in the literature on field dependence-independence to suggest that such a relationship exists. The question is also a critical one for community college's which serve large numbers of occupational students.

This study was conducted with Developmental students. The cognitive style assessed was field dependence-independence.

# FINAL REPORT OF PROJECT CASE STUDY

MONROE COMMUNITY COLLEGE - Joan Wilson
A. Rosica
C. Richardson

## SECTION I

### Hypothesis

After exposure to a variety of career choices, a student will choose a career field compatable to his cognitive style as determined by the Group Embedded Figures Test.

## SECTION II

### Population

The population for this study consisted of 21 Developmental Studies students enrolled in the course, GST 091, Reading Writing and Interpersonal Relationships. The students were enrolled in Developmental Studies because of their need for work in basic skills as determined by the admissions counselors after an interview and a review of their high school records. There were 10 women and 11 men in the study. Their ages ranged from 18-37.

### Procedures

Each participant was given the Group Embedded Figures Test in February, 1976. The test was administered by Kay Martens of the Two Year College Development Center.

During the semester emphasis was placed on career decision-making skills.

Effort was made to acquaint the students with the various career options open to them at the College in terms of specific career programs. A variety of exercises and techniques were used to implement this goal. Some of them were as follows:

1. Values Clarification exercises dealing specifically with the world of work: for example, values continuum containing items pertaining to job conditions.

2. Weekly visits by career department chairpersons to describe the various career programs within the College.

3. The Strong-Campbell Interest Inventory was administered to each student in March, 1976. A private conference was scheduled to discuss the results with each student.

4. Each student completed a Student Personal Profile by using the Occupational View-deck.

5. Each student made a community visit in a specific career field and presented an oral report to the class.

6. During the last two weeks of the course, each student identified a career choice.

Results of Data

1. Total Sample

It was found that 19 of the 21 in our sample, or 90.5%, were rated as field dependent on the Group Embedded Figures Test.

Two of our sample dropped out of the program before completion.

Of the 19 remaining in the sample, 11, or 58%, chose career fields that were compatible with their cognitive styles; 1 did not select a career; 1 chose a field not compatible; 1 made no choice, and 6 made choices in career fields we were unable to classify.

2. Field Independent

Two of our sample were classified field independent; 1 chose a technically oriented career; 1 chose a career we were unable to categorize.

3. Field Dependent

We found that 19 of our sample scored in the field dependent range as determined by the Group Embedded Figures Test. Of the 19, 10 chose careers that were people-oriented; 5 chose careers that we were unable to classify in terms of field dependent, field independent; 2 dropped out of the program before completion; 1 made no choice; 1 field dependent person chose a field independent career.

SECTION IV

Conclusions

It was found that more data is needed to determine whether career selection in community college programs fall into the category of field dependent or field independent. All of the research available pertains to four year college majors. This data is necessary in order to make any valid conclusions concerning our study.

We found that 58% of our sample chose careers compatible with their cognitive style as determined by the following statement taken from Accent on Learning by Patricia Cross, page 121.

> The social orientation of field dependents carries over into their choice of a college major. Field dependents tend to choose fields of study that involve people and human relations--social services, counseling, teaching, business. In contrast, field independents favor the sciences mathematics, physics, biology, engineering. Furthermore, field dependents who initially choose a science major are especially likely to change their major--from the sciences to a more people-oriented field.

We found that some real questions exist concerning the reliability of career choices of Developmental Studies students after one semester in a community college.

## SECTION V

### Suggestions for Future Projects

Offered a variety of decision making tools, is there a correlation between cognitive style and the methods of exploration used? Specifically, what are they?

To what extent have field dependents made career decisions based primarily on role models? If so, what is the cognitive style of the role model?

Is there a correclation between cognitive style as determined by the Group Embedded Figures Test and career program choice in the community college?

Which career programs in the community college are field independent and field dependent oriented?

Implications

As this study suggests further research on the educational - vocational choices of community college students is needed. Such an implication has also been suggested by Sankar Sastri's study (see Chapter IV). This type of information should be helpful to faculty, counselors and students.

Much emphasis has been placed, in previous chapters on the instructional implications of cognitive style. Counseling programs can also benefit for the use of this information. While the finding of this study does not provide "results" on the question, they raise important questions for additional research and suggest an important role for career guidance.

# Chapter VII

## PROJECT INFORMATION

This chapter contains data compiled by project staff on the college rojects and a staff project. Bernie Rotundo's report summarizes the rocedural aspects of the campus projects. This information on the time, osts and personnel involved in the projects provides some insight into he work involved in the projects. Dennis Nielsen report on testing ummarizes the procedures used and the number of students involved.

An interesting aspect of Project Priority:Occupational Emphasis, at east for the staff, was the development of a staff case study. This case tudy, which focuses on match-mismatch of participants and activities, was mplemented at the March workshop. Although implemented in a staff development etting, project staff see it as easily replicable in a classroom setting.

The chapter concludes with the implications of the campus projects in eneral. These implications were suggested by participants following the resentations of reports at the Summary Activity. They have been summarized y Kay Martens.

## Summarization of Procedural Reports of Campus Case Studies

Bernard Rotundo
Two-Year College Development Center

Participants in Project Priority: Occupational Emphasis were asked to
't on the logistical aspect of developing and carrying out the projects
heir campuses. This report provides a summary of all the case studies
ve the reader illustrations of the procedural aspects of the partici-
projects. Participants were asked to complete a form for Project
. The forms dealt with a number of issues in developing a project,
example the number of people involved, an estimate of the costs and
involved, student reactions and faculty reactions.

Of the thirteen projects reported, eight were done by individuals
five were done by teams. The projects mainly dealt with one of the
basic research questions developed by the project staff and the campus
ltants. A few dealt with issues related to individual interests.

In terms of people involved, the individual projects ranged from 21 to
tudents and faculty. The team projects ranged from 17 to 459 students
faculty. Project staff was concerned with the amount of support the
s provided and whether approval was necessary in carrying out the campus
ct. Team projects tended to need less approval than individual projects
se usually the person who would be in position to approve a project was
ally a member of the campus teams. The types of people who usually
ed the approval were college presidents, deans of instruction and
tment chairmen.

The project staff was interested in the amount of time that was
d for the development and carrying out of the project. Categories were
p for a breakdown of the time involved. Again the projects were divided

team projects and individual projects.

| | Range for Team Projects | Individual Project |
|---|---|---|
| Planning | 8 hours - 3 weeks | 3 hours - 30 hours |
| Developing Materials | 2 hours - 5 days | 1 hour - 20 hours |
| Testing, Scoring, Exploration and Returning of Tests | 18 hours - 370 hours | 2 hours - 47 hours |
| Writing Up Case Results | 2 hours - 25 hours | 2 hours - 40 hours |
| Total Time Needed to Plan and Implement Case Study | 75 hours - 478 hours | 27 hours - 132 hours |

In analyzing the amounts of time needed it can be seen that the team ects took a considerably greater amount of time than did the individual ects. Participants stated that because of job responsibilities and other itments team meetings were often difficult to arrange. The planning and ing appeared to need the greatest amount of time.

To consider replication of projects and designs for future projects, staff interested in the types of materials needed and the costs incurred. The lts indicated that the team projects as well as the individual projects basically the same materials. The tests, "choosing a path", "paper folding", bal puzzles", "scrambled words", Group Embedded Figures Test, Hidden res, Strong Campbell Interest Inventory were used by the majority of icipants. The miscellaneious materials used were transparancies, paper pencil, duplicating materials, etc. Costs incurred for projects ranged $0, (Project staff provided some materials) to $1,500 (for 500 tests). total costs of the projects including salaries of those involved were:

Individual Projects - Range: $457-$2,030 with a $\bar{x}$ of $690

Team Projects - Range: $510-$2,448 with a $\bar{x}$ of $1,495.

hould be noted that the cost of faculty time is computed in the total s. Many of the fuctions are performed during the academic day and semester are not above and beyond the normal salary of the faculty member.

Included in the project staff procedural form were questions on faculty student reactions. The students generally were favorable to involvement he project. There comments range from "willing" to "not interested". lty reactions were generally favoragle with comments ranging from itive", "curious" to "skeptical". The Project staff inquired if the teen participants planned to continue to work with cognitive style next . There were 12 yes's and 1 "I don't know" which was noted that the icipant was not sure of a team involvement but definitely yes as an vidual participant.

# Summarization of Testing Procedures

Dennis Nielsen
Dept. of Curriculum & Instruction
State University of New York at Albany

Assessment of two-year college students' cognitive styles was a major effort of project participants. These data were requested by the project staff for the specific purpose of generating community college student norms for each assessment instrument. To provide consistency of testing, specific assessment instruments were suggested. The Group Embedded Figures Test (GEFT) was suggested for use in measuring the extent of Field Independent and Field Dependent style of students. Directions for the administration of the GEFT could be found in the accompanying manual. Road Signs Test, Identical Pictures, Scrambled Words and Following Directions were suggested for measuring the McKenney Model of Perceptive, Receptive, Intuitive and Systematic, respectively. Dr. Nelson developed instructions for administering and scoring the McKenney Model Test Battery. These instructions were distributed to each project participant. They are as shown on the attached sheet.

All participants returned the results of cognitive style assessments. The number of students assessed by each instrument is reported.

| ASSESSMENT INSTRUMENT | NUMBER OF STUDENTS |
|---|---|
| Hidden Figures | 758 |
| Paper Folding | 708 |
| Identical Pictures | 250 |
| Scrambled Words Part I | 277 |
| Scrambled Words Part I & II | 498 |
| Choosing a Path | 505 |
| Verbal Puzzles | 503 |
| Road Signs | 58 |
| Maria College Inventory | 101 |

Although there were sufficient number of students to develop norms, administration of the instruments lacked consistency. This severly limited confidence in the norms. Trends, however, could easily be identified and were discussed.

To gather more consistent information in the future, participants were requested to recall the instruction on the McKenney Model. To aid in ease of reporting, an informational matrix was distributed. This matrix contains reporting cells for project participants to complete and return to the Center staff. This matrix is attached.

It is hoped future efforts of project participants will generate sufficient data for the construction of valid two-year college student norms. These norms will then be disseminated for comparison purposes.

TWO-YEAR COLLEGE DEVELOPMENT CENTER
State University of New York at Albany

Karen H. Nelson
May 1976

INSTRUCTIONS FOR ADMINISTERING AND SCORING MCKENNEY MODEL TEST BATTERY

Preceptive:
Road Signs Test - 5 minutes. Instructions: The signs are to be international (no word on the sign itself). However, if you want to write a word designating a drawing (e.g., cow with an arrow to the drawing), you may.

Scoring - Count the number of signs drawn and the number of categories used. When creating the distribution use #signs/#categories. For example,

| | Signs | Categories | #signs / categs. Ratio |
|---|---|---|---|
| S1 | 22 | 8 | 2.75 |
| S2 | 15 | 5 | 3.00 |
| S3 | 16 | 8 | 2.00 |

Since a preceptive style involves conceptual clustering, a category (e.g., restaurant) should elicit several associations. When I examine preceptive scores I compare the distribution for both #signs and the ratio:

| | | |
|---|---|---|
| S2(15) | S3(16) | S1(22) |
| (S3)2:00 | (S1)2.75 | (S2)3.00 |

Here S2 is lowest if I look at the #signs, h[illegible]est if I look at the ratio. I check his drawings to see whether he seems to be working with multiple associations (preceptively) or generating variations on a single theme (a receptive or systematic strategy). At Glens Falls, the ratios worked best and I juggled a ranking only a couple of times, so this control may not be worth your while. Use it only if you want a more precise ranking or if you find huge discrepancies between ranks assigned by #signs and those assigned by ratios.

Receptive:
Identical Pictures (1 1/2 mins. each half)

Scoring: Calculate # correct and # errors
score = correct - 1/4 (# errors)
errors are those wrong, not unattempted

Intuitive:
Scrambled Words (2 1/2 mins. each half)

Scoring: # correct, # errors
score = correct - 1/3 (# errors)

Systematic:
Following Directions (3 1/2 mins. each half)
Scoring: # correct, # errors
score = # correct - 1/4 (# errors)

(cont'd next page)

If your're administering the instruments to more than one group, use differen: test orders. I use time and task to alternate, e.g.,:

Grp 1:
Road Signs (5 mins. visual, drawing)
Scrambled Words (5 mins. verbal, reasoning)
Identical Pictures (3 mins. visual, objective)
Following Directions (7 mins. verbal, reasoning)

| Grp 2: | Grp 3: | Grp 4: |
|---|---|---|
| IP | RS | IP |
| FD | FD | SW |
| RS | IP | RS |
| SW | SW | FD |

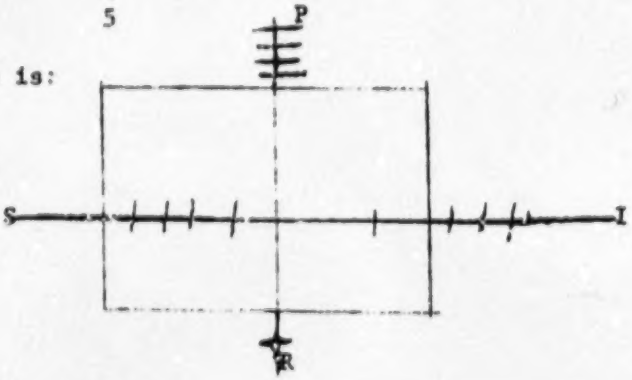
After instruments are scored, rank raw scores:

e.g.,
1 ——————————→ 50

If you have under 30 subjects, use only 3 ranks, over 30 use 5, over 50 use 7. If 35 subjects, those subjects with the lowest 7 scores are assigned the rank of 1, those with 8th - 15th scores rank 2, and so on. With all 4 instruments each subject ends with a profile:

| | | Rank |
|---|---|---|
| S1: | R.S. | 1 |
| | S.W. | 2 |
| | I.P. | 4 |
| | F.D. | 5 |

His profile is:



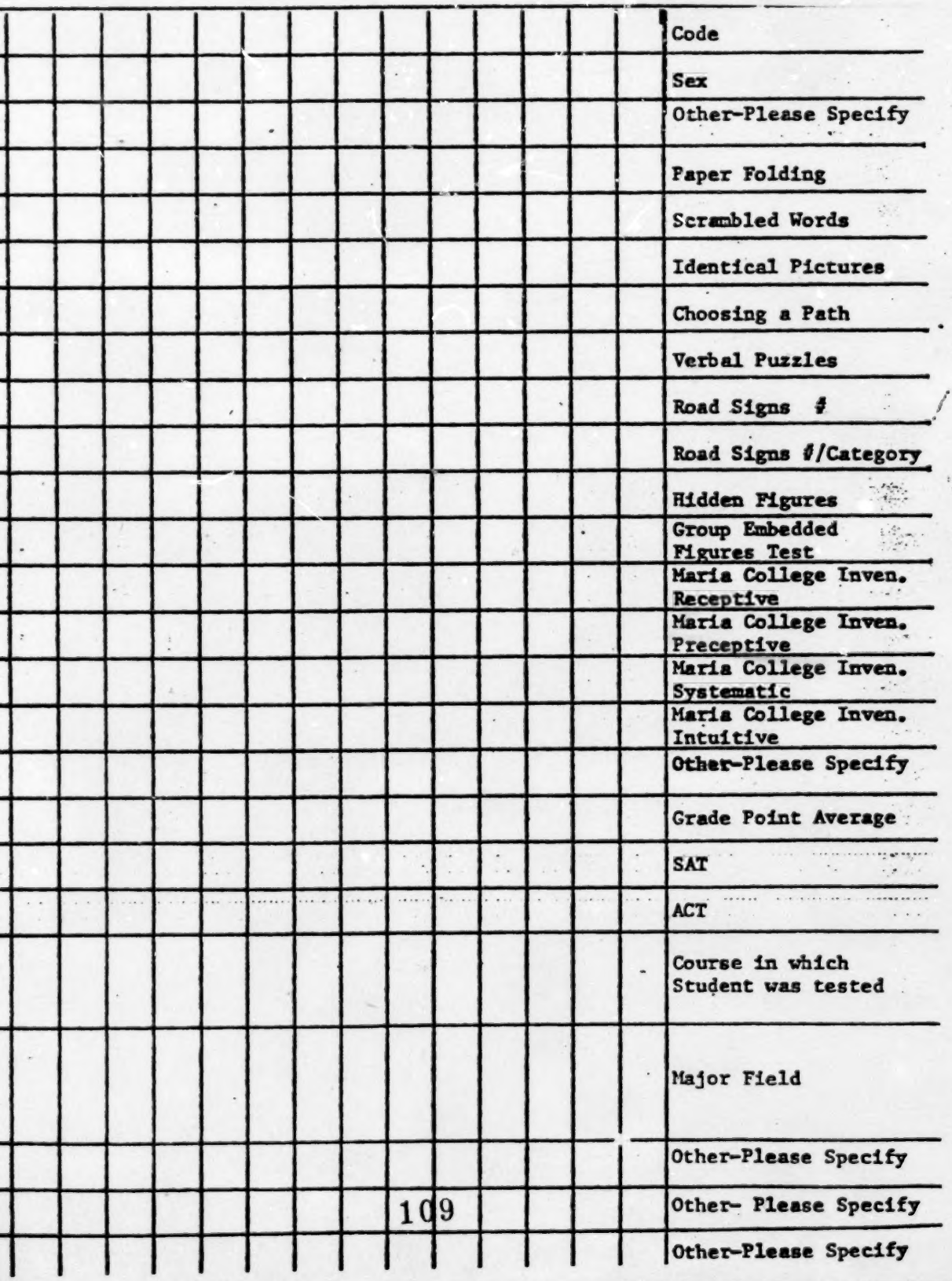

His style is:
Systematic Receptive

If the rank difference on one dimension is two or more, you can be reasonably confident that the individual has a style. Differences of 1 are treated as 'maybe or neutral' (Over, fifty subjecgs, 'maybe', less than fifty 'maybe or neutral' is safer).

Asking subjects for feed-back is always advisable. Give them the profile, explain it if they don't know the model and ask if it makes sense. If possible, use the inventory as well as the test battery and compare the two separate style estimates.

Send to:

Two-Year College Development Center
State University of New York at
Albany
135 Western Avenue
Drpaer Hall, Suite 049
Albany, New York 12222



TWO-YEAR COLLEGE DEVELOPMENT CENTER
State University of New York at Albany

# FINAL REPORT OF THE WORKSHOP CASE

Dennis Nielsen
Dept. of Curriculum & Instruction

## SECTION I

### Hypothesis

$H_1$: Community college faculty who are matched with session presenters on the Field Independent/Field Dependent dimension, rate the compatibility of their learning style with the instructional method of that session significantly higher than community college faculty who are mismatched.

$H_2$: There is no significant compatibility of learning style difference between community college faculty who are matched with their session presenters on the Systematic/Intuitive dimension.

$H_3$: Systematic community college faculty's learning styles will be significantly more compatible than Intuitive community college faculty's learning styles for the instruction methods of Lecture (Large and Small Group), Independent Work and Testing.

$H_4$: Intuitive community college faculty's learning styles will be significantly more compatible than Systematic community college faculty's learning styles for the instructional methods of Discussion (Large and Small Group), Individual Conference, Hands-on-activity, Social Time and Question and Answer.

$H_5$: Field Independent community college faculty's learning styles will be significantly more compatible than Field Dependent community college faculty's learning styles for the instructional methods of Lecture (Large and Small Group), Independent Work and Testing.

$H_6$: Field Dependent community college faculty's learning styles will be significantly more compatible than Field Independent community college faculty's learning styles for the instruction methods of Discussion (Large and Small Group), Individual Conference, Hands-on-activity, Social Time and Question and Answer.

### Questions

$Q_1$: Which methods of instruction are most compatible with the learning styles of Systematic, Intuitive, Field Independent and Field Dependent community college faculty?

$Q_2$: Which methods of instruction are least compatible with the learning styles of Systematic, Intuitive, Field Independent and Field Dependent community college faculty?

## SECTION II

### Population

The population for this study consisted of 31 community college faculty participants in the Project Priority:Occupational Emphasis Workshop. This workshop was conducted by the Two-Year College Development Center of SUNYA.

### Procedures

At the opening session of the Project Priority:Occupational Emphasis Workshop, each participant was given the Reaction Survey Form (RSF). This instrument was designed to measure the compatibility of each instructional method used by the workshop staff with each participant's learning style.

For each identified workshop session, the participants were to select the instructional method(s) (Lecture Large Group, Lecture Small Group, Discussion Large Group, Discussion Small Group, Independent Work, Individual Conference, Testing, Hands-on-activity, Social Time or Question and Answer) that was used by the project staff to meet the objectives of the session. A definition of each method was included in the instructions. Each participant was then instructed to rate each method as it related to their learning style. The rating scale consisted of a 5-point Likert type scale with 1 designated to identify the method as very compatible with h/her learning style, a 2 defining the method as somewhat compatible with h/her learning style, a 3 identifying the method to be neither compatible nor opposed to h/her learning style, a 4 identifying the method as less than compatible with h/her learning style and a 5 defining the method as not compatible with h/her learning style.

Each participant was given the Group Embedded Figures Test (GEFT) in order to measure their degree of Field Independence and Pete Idelman's McKenney Model Inventory (PII) to identify their Systematic and Intuitive preferences.

Participants were grouped according to their scores on the GEFT. Those with high scores (13-18) formed one group. Participants with scores of 1-6 or 7-12 were placed in a second group. Each of two presenters for the Testing session reported high Field Independent scores, therefore, the participant group with high scores on the GEFT were matched on that cognitive style dimension and those with low scores on the GEFT (1-6) were mismatched. Those participants whose scores on the GEFT ranged from 7-12 were dropped from the match/mismatch groups.

A second matching was completed for the Campus Planning session. Systematic participants (those with a PII score from 11-15 on the Systematic scale) were placed with a Systematic presenter. Intuitive participants (those with a PII score from 11-15 on the Intuitive scale) were placed with an Intuitive presenter. Participants who were neither Systematic nor Intuitive were identified as In-Betweens and placed in a session with a Systematic and an Intuitive presenter. Thus the groups were matched on the Systematic and Intuitive cognitive style dimension.

SECTION III

Results of Data

Table I

The number of participants, (N) the number of responses on the RSF (n), means on the RSF ($\bar{X}$), standard deviations (sd) and t-test between means of matched Field Independent and mismatch Field Dependent Community College faculty

| Matched Group Field Independent | | | | Mismatched Group Field Dependent | | | | t |
|---|---|---|---|---|---|---|---|---|
| N | n | $\bar{X}$ | sd | N | n | $\bar{X}$ | sd | |
| 18 | 63 | 1.92 | 1.11 | 6 | 18 | 2.28 | .83 | 1.33* |

*$p \leq .10$, d.f.=79

It was found that community college faculty who were matched with session Presenters on the Field Independent/Field Dependent dimension rated the compatibility of their learning style with the instruction method employed in the Test session significantly ($p \leq .10$) higher than community college faculty who were mismatched (see Table 1). Although there were 63 responses for the matched group and only 18 responses for the mismatch group, it is comparable since the matched group is 3 times larger than the mismatched group. H1 was supported.

Table II

The number of participants (N), the number of responses on the RSF (n), means on the RSF ($\bar{X}$), Standard deviations (sd) and t-test between means of the matched Systematic and Intuitive community college faculty.

| Systematic | | | | Intuitive | | | | t |
|---|---|---|---|---|---|---|---|---|
| N | n | $\bar{X}$ | sd | N | n | $\bar{X}$ | sd | |
| 9 | 7 | 2.14 | 1.07 | 9 | 6 | 2.67 | 1.63 | .69 (NS) |

NS: Not Significant

It was found that there was no significant compatibility of learning style difference, tested at $p \leq .10$, between community college faculty who were matched with their session presenters on the Systematic/Intuitive dimension (See Table 2). H2 was supported.

cont'd - SECTION III

Table 3

The number of participants (N), the number of responses on the RSF (n), means on the RSF ($\bar{x}$). Standard deviations (sd) and t-test between means of the Systematic and Intuitive participants by instructional method.

| | SYSTEMATIC N= 9 | | | INTUITIVE N= 9 | | | |
|---|---|---|---|---|---|---|---|
| Instructional method | n | $\bar{x}$ | sd | n | $\bar{x}$ | Sd | t |
| Lecture Large | 17 | 2.47 | 1.07 | 19 | 2.42 | 1.12 | NS |
| Lecture Small | 8 | 1.50 | .53 | 18 | 2.00 | .97 | * |
| Discussion Large | 5 | 3.00 | 1.22 | 8 | 1.63 | .52 | *** |
| Discussion Small | 26 | 1.77 | 1.18 | 44 | 1.68 | .93 | NS |
| Independent Work | 6 | 2.00 | .63 | 8 | 2.13 | .83 | NS |
| Individual Conference | 6 | 1.33 | .52 | 7 | 1.43 | .53 | NS |
| Testing | 11 | 2.30 | 1.16 | 28 | 1.82 | 1.12 | NS |
| Hands-on-activity | 4 | 1.00 | 0.00 | 14 | 1.07 | .27 | NS |
| Social Time | 20 | 1.90 | 1.07 | 21 | 1.86 | .96 | NS |
| Questions & Answers | 22 | 2.45 | 1.53 | 17 | 1.88 | .93 | * |

* $p \leq .10$
***$p \leq .01$

Although no mean of the ratings on instructional methods approached less than compatible, there were significant differences for the methods Lecture Small, Discussion Large and Question and Answer. Systematic participants were significantly more compatible on their learning styles than Intuitive participants on the Lecture Small instructional method. In addition, Intuitive participants were significantly more compatible on their learning styles than Systematic participants on both Discussion Small and Question and Answer instructional methods. These support portions of hypothesis 3 and 4. No other ratings on learning styles were significantly different for Systematic and Intuitive participants.

cont'd - SECTION III

Table 4

The number of participants (N), the number of responses on the RSF (n), means on the RSF ($\bar{x}$), Standard deviations (sd) and t-test between means of the Field Independent and Field Dependent participants by instructional methods.

| Field Independent N= 18 | | | | Field Dependent N= 6 | | | |
|---|---|---|---|---|---|---|---|
| Instructional Method | N | $\bar{x}$ | sd | n | $\bar{x}$ | sd | t |
| Lecture Large | 35 | 2.66 | 1.21 | 13 | 2.77 | .93 | NS |
| Lecture Small | 27 | 1.93 | 1.04 | 3 | 1.67 | 1.15 | NS |
| Discussion Large | 13 | 2.62 | 1.12 | 5 | 2.00 | .71 | NS |
| Discussion Small | 68 | 1.96 | 1.06 | 16 | 1.69 | 1.01 | NS |
| Independent Work | 18 | 1.39 | .61 | 5 | 2.20 | .45 | *** |
| Individual Conference | 11 | 1.55 | .52 | 4 | 1.00 | 0.00 | ** |
| Testing | 26 | 1.67 | .94 | 8 | 2.00 | .76 | NS |
| Hands-on-Activity | 23 | 1.13 | .46 | 7 | 1.14 | .38 | NS |
| Social Time | 36 | 2.00 | 1.01 | 12 | 1.58 | .67 | * |
| Question & Answer | 43 | 2.14 | 1.32 | 8 | 1.88 | .83 | NS |

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

Although no mean of the ratings on instructional methods approached less than compatible, there were significant differences for the methods Independent work, Individual Conference and Social Time. Field Independent participants were significantly more compatible on their learning styles than Field Dependent participants on the instructional method Independent Work. In addition Field Dependent participants were significantly more compatible on the learning styles than Field Independents on both Individual Conference and Social Time instructional methods. These support portions of hypotheses 5 and 6. No other ratings on learning styles were significantly different for Field Independent and Field Dependent participants.

cont'd - SECTION III

Table 4

Hands-on-Activity, Individual Conference and Lecture Small seem to be the methods of instruction, Systematic participants rated as most compatible with their learning styles. While Testing, Large Lectures and Question and Answer were rated lease compatible (see Table 3)

Intuitive participants rated Hands-on-Activity, and Individual Conferences as the instructional methods which were most compatible with their learning styles. Intuitive participants rated Lecture Large as least compatible. (See Table 3),

Field Independent participants rated Indepent work and Hands-on-Activity as most compatible with their learning styles. Field Dependents participants agreed on Hands-on-Activity but also included Individual Conferences as the most compatible instructional methods and their learning styles (See Table 4).

Large Lectures and Discussion were rated as least compatible with Field Independent participants learning styles. Field Dependent participants rated Lecture Large as the least compatible (See Table 4).

## SECTION IV

Conclusions

1. It was found that community college faculty who were matched with Session presenters on the Field Independenn/Field Dependent dimension rate the compatibility of their learning style with the instructional method of that session significantly higher than community college faculty who were mismatched.

2. It was found that there was no significant compatibility of learning style difference between college community faculty who were matched with their session presenters on the Systematic/Intuitive dimension.

3. It was found that Systematic Community College faculty's learning styles were significantly more compatible than Intuitive community college faculty's learning styles for the instructional method of Lecture Small.

4. Intuitive Community College faculty's learning styles were significantly more compatible than Systematic Community College faculty's learning styles for the instructional methods of Discussion Large and Question and Answer.

Conclusions (cont'd)

5. There was no significant difference between Systematic and Intuitive community college faculty on their learning style compatibility with the instructional methods of Lecture Large, Discussion Small, Independent Work, Individual Conference, Testing, Hands-on-Activity and Social Time.

6. It was found that Field Independent Community College faculty's learning styles were significantly more compatible than Field Dependent Community College faculty's learning styles for the instructional method of Independent Work.

7. It was found that Field Dependent Community College faculty's learning styles were significantly more compatible than Field Independent Community College faculty's learning styles for the instructional methods of Individual Conference and Social Time.

8. It was found that there was no significant difference between Field Independent and Field Dependent community college faculty on their learning style compatibility with the instructional methods of Lecture Large, Lecture Small, Discussion Large, Discussion Small, Testing, Hands-on-Activity and Question and Answer.

9. It was found that Hands-on-Activity was the instructional method most preferred by Systematic, Intuitive and Field Independent Community College faculty.

10. It was found that Individual Conference was the instructional method most preferred by Field Dependent Community College faculty.

11. It was found that Lecture Large was the least preferred instructional method by Systematic, Intuitive, Field Independent and Field Dependent Community College faculty.

SECTION V

Suggestions for Future Projects

1. Is there a significant difference between preferred instructional methods of other cognitive style dimensions?

2. Is there a significant difference between preferred instructional methods of Community College students?

3. Does the presenter significantly influence instructional method preferences of differing Cognitive Styles?

4. Do Field Dependent students prefer instructional methods which provide an opportunity for discussion significantly more than Field Independent students?

5. Do Community College faculty use the methods for their own instructional practices as those they prefer? Does cognitive style effect this hypothesis?

Campus Projects

Implications*

- Suggest working with students who are on the extreme ends of the style continuium.
- Suggest focusing attention on students who are experiencing academic difficulties.
- It is extremely important that we know which teaching strategies and materials are appropriate for which styles.
- Since we often work with a transient student population, it is equally as important to focus on the value of providing cognitive style information to students. This is true even if we can't document improved performance.
- Better methods are needed to assess the value of cogntive style information for students.
- Stress should be placed on providing educational options for a variety of style differences.
- It may be important to team faculty(or to build faculties) with different styles.
- It is important to remember that cognitive style is only one dimension of individual differences.

* Summarized by Kay Martens

Chapter VIII

# SUMMARY AND SUGGESTIONS FOR FURTHER WORK

This chapter contains a condensed version of a paper prepared for Summary Activity participants by Karen Nelson.* In this volume it provides summarization of the reports and excellent suggestions for further work.

*The Editor apologizes to the author for the necessity to condense. Copies of the complete report are available through the Center.

# Cognitive Style Implementation: Project Priority, 1975-1976

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The comments which follow address six questions asked by participants in Project Priority. In lieu of responding to specific attempts to implement cognitive style notions in college settings, I've chosen to provide general comments which may facilitate further implementation. As used below, cognitive style refers to McKenney's information-processing model of cognitive style (systematic-intuitive and receptive-preceptive dimensions), Witkin's model of field dependence-independence, and Kagan's model of reflection-impulsivity.

Is Cognitive Style a Determinant in the Type of Materials Students Select in a Learning Laboratory?

The greatest difficulty entailed in investigating this question is ensuring that students see options as viable choices. Most students believe in a perfect type of learning as firmly as they believe in "right" answers and perfect teaching. Little or nothing in their experience suggests that there are alternative learning paths which lead to the same goal, at least not legitimate alternatives. Thus, one can expect students to be skeptical of any setting in which they are asked to make choices.

The field dependent, intuitive, or impulsive student is additionally disadvantaged. Since cognitive style is a pervasive, often unconscious individual difference in information-processing, how can any student know how to select effective learning methods? The three styles noted above are theoretically value-free but empirically devalued in

many educational contexts: the student with any of these styles may not have available model of effective learning while her/his counterpart in style does. If twenty-five years of research has not provided an operational definition of field dependent learning processes, how can we expect students to readily provide one? One can hypothesize that field dependents and intuitives learn better from people (either the instructor or groups), but do they know that or take advantage of opportunities to do it? Ron Hileman and Morgan Desmond's studies provide tentative support for these hypotheses. Ron Hileman's data, for example, relates field dependence and independence to preferences for learning through people (instructor or student tutors) or other sources (text, programmed text or film strip).

Ron Hileman's study also suggests that field dependents are less sure of <u>how</u> to make and use choices. A cursory comparison of what students <u>said</u> they preferred with what they <u>did</u> in using alternatives indicated that 70% of the field independents did what they said they would while, at best, 57% of the field dependents did.

Morgan Desmond's analysis contains additional information. First, field dependent and intuitive styles are different. Morgan Desmond confirmed an hypothesis for systematic-intuitive differences, but obtained only slight differences between field dependents and independents. Second, learning style interacts with strength of style. While systematics use the text more often than other options, consultations less, highly systematic students do not. Since examination of scores on a single instrument for the McKenney model confounds style with test-taking speed and other correlates of "abilities," students doing well on the systematic task may be able to learn with fewer

readings of the text or may learn more readily in any context. Distinctiveness of style, even when controlled for "abilities," relates to earlier and more confident decision-making concerning major and vocation; these decision-making differences may extend to learning alternatives as well. Thus, strength of style or interaction between style and ability may relate to different uses of learning alternatives.

The question of learning options also concerns additional data that should be collected beyond style data and choices made. Recommendations include:

a) attempt to make clear the purpose of learning options in the first place; don't assume their purposes are self-evident.

b) ask students to evaluate options before during, and after they explore them; examine style relative to these evaluations for individuals.

c) if an established learning laboratory or method of providing alternatives is not being used, students may do poorly using methods they expect will fail or may not investigate unconventional alternatives at all. Such attitudes may affect performance and analysis of alternatives.

Does a Program for Students in Cognitive Style Information Improve Learning Performance?

This question includes discussion of three issues: testing conditions, style analysis and performance measures. While these issues relate to other implementation questions, they are especially critical to this question. Earlier, I suggested that learning choices

imply that students must assume responsibility for effective learning. Administration of cognitive style instruments must take place under circumstances in which assuming responsibility for learning offers potential, and hopefully real, rewards.

When payoffs are clarified, both students and teachers benefit. Teachers benefit most when students become actively involved in the learning process. Active involvement can be fostered in several ways:

1. Assessment of course-related expectations, preferences and biases can help instructors identify individual differences in students that may not relate to specific style models, yet can assist in developing teaching strategies, learning options, and goal-setting.
2. Assessment can be related to prediction (how easy or hard, how much you'll like or dislike a task) after reading instructions and doing sample items, and evaluation of the same scales after performing the task. If nothing else, the student and the teacher obtain information about ability to accurately predict performance.
3. By promising students feedback about their own styles and the opportunity to give the instructor feedback (in the form of several course evaluations, for example), a feedback loop is established. What the student thinks (as well as how he thinks) is valid and valuable; it can, in turn, improve his chances of learning more, performing better.

In addition to providing the student the opportunity to be actively involved in learning, in each of these cases the instructor obtains information that may be helpful to him or her, even if a

articular cognitive style does not influence students' performance
n a course. Again, both student and teacher benefit from the
sses sment procedure itself.

Style analysis involves two critical notions, style/strategy
istinctions and neutral styles. The distinction between style
nd strategy is especially important given earlier comments about
tudents' perceptions of viable choices and the absence of models
or students with field dependent, intuitive, impulsive, and,
erhaps, perceptive styles. While styles are unconscious habits,
trategies are learned techniques. For example, an individual with
systematic style is naturally inclined to make lists, outlines, etc.
n intuitive individual may have learned to make lists after spending
80 at the supermarket without getting milk, bread, eggs, etc. Both
ill report using shopping lists, one according to style, the other
ccording to strategy.

In addition to distinguishing style from strategy, this example
llustrates a further problem in style assessment. An inventory or
uestionnaire may elicit strategy, especially among individuals whose
tyle has posed problems and failures in the past. In general, field
ndependent, systematic, reflective, and receptive styles are favored
n public schools (college may favor the perceptive mode as a means
f coping with overload). Students with the alternate styles may
eport "desirable" strategies or they may never have been offered
trategies appropriate for their styles.

One way of dealing with style/strategy differences is to ask
tudents about them. Peter Idleman has developed an inventory for
cKenney's model; Joe Taylor uses a shorter, more course-related
nventory. As in prediction and evaluation of tasks during style

assessment, here again one slows down the assessment process without changing the instrument. One option is to ask students to complete an inventory twice, once reporting 'desired' behavior (how I would like to be), once reporting 'actual' behavior (how I behave most of the time). Another option is to prepare an answer sheet with 5-point scales. After students have made forced - choices, ask them to scale each response as follows:

| | Never | | | | Always |
|---|---|---|---|---|---|
| I concentrate on my method | 1 | 2 | 3 | 4 | 5 |
| I concentrate on the overall problem | 1 | 2 | 3 | 4 | 5 |

Comments: _____

_____

_____

Instruct students that when a choice is difficult or there is little discrepancy in ratings, they should explain when they do each, which one has led to failure or problems more often, which they remember learning or being taught, etc. While assessment takes more time, the likelihood of separating style from strategy is greater.

The style/strategy distinction applies to many situations other than analysis of inventory data. The student who brings systematic strategies to discussion groups may decide he learns better by reading the text - another example of ways in which students reduce learning options. Teaching strategies, counseling students about the implications of style, modifying style or developing coping strategies - all depend on a better understanding of strategies.

Neutral style is a second major problem area in style analysis.

By definition, an individual is neutral in style if his assessment places him at neither end of a style dimension (usually defined by ± 1 standard deviation from the mean). Historically, neutral style has not been investigated in favor of better understanding the extremes of each dimension. More recently, research on the McKenney model has examined the correlates of not having a distinctive style. This discussion focuses on the McKenney model but hopefully offers generally useful notions.

Since the McKenney model is two-dimensional, one's information-processing style is described as a four-sided cognitive operating space. In addition to distinctive styles on both dimensions, style can take the following forms:

a) preceptive or receptive style, neutral on the strategy dimension;

b) systematic or intuitive style, neutral on the data dimension;

c) data dominance = when both preceptive and receptive ranks exceed both intuitive and systematic ranks;

d) strategy dominance - when both systematic and intuitive ranks exceed both receptive and preceptive ranks;

e) neutral style - when all four modes are within one rank of each other (depicted as a centered, square operating space).

Conceptually, neutrality can be seen as a disadvantage (in not having a distinctive style) or as "switching," being able to allow the task to determine which mode is used. The ability to "switch" obviously has merit and we are often asked if the neutral or "balanced" style isn't the most desirable. While the answer to that question is not yet clear, the following are correlates of neutral style:

1) The size of the operating space of neutrals is smaller, on the average, than that of distinctive styles, suggesting a tradeoff in which depth is sacrificed for flexibility;
2) significantly more freshmen than seniors have neutral styles;
3) distinctive styles relate to earlier and more confident choices in major and vocation;
4) seniors with neutral styles are uncertain about career choices, but have less often changed their choices since freshman year.
5) after completing a written task, students with neutral style more often feel the task failed to assess their skills.

These findings pertain to those individuals whose style is neutral n both dimensions.

Often, as many as 40% of students tested have neutral styles. ince distinctive style relates to both age and career choice, we on't know how the interactions operate: Do we become more rigid with ge or will older students who've not channeled their energies compare ith undecided freshmen? Careful analyses of further correlates of eutral style are needed for all style dimensions. In our data, ystematic and intuitive students sometimes resemble one another, while eutral students differ. Examining neutral style in its own right is n important component of style analyses.

Performance is a desirable outcome measure in cognitive style mplementation. There are, however, several aspects of performance hat can be examined. First, any performance must be motivated. econd, assessing style and telling students about style may motivate hem to think about performance. Third, performance must be measurable. areful examination of performance definitions is another means of enefiting both student and teacher in cognitive style implementation.

s there an Inverse Relationship Between Mismatching of Cognitive tyle and Performance in Occupational Curricula?

Here, I wish to focus on three issues, two providing data elating the McKenney model to vocational choices and personality haracteristics, the third a concern. I'll begin with my concern.

Much is known about vocational correlates of field independence nd dependence, less about McKenney's dimensions and Kagan's reflective-ess-impulsiveness. My concern is that correlates not be seen as dicts - there are field dependent biologists, intuitive engineers, nd impulsive mathematicians. In fact, much originality is contributed y unconventional members of any vocation.

Vocational data is available for four-year college students, but ittle for two-year students. For the McKenney model, some general and previously unpublished) data may be helpful. Natural sciences ttract systematic and receptive students; Humanities, intuitive and receptive students; Social Sciences include a greater mix of styles, ore students with neutral styles and more data dominant styles. atural science majors more often have strategy-dominant styles. eniors in Natural Science and Humanities are more homogeneous than reshmen (more nat. sci. majors are systematic, receptive, more um. majors are non-intuitive perceptive. These data provide some uggestions about majors; data on vocational choices are available n request.

In examing teacher/student interactions, a wide range of styles nd other criteria may be important. A few personality correlates of tyles in the McKenney model may be relevant to teacher selection and valuation. Since data has not been available when I've been asked

about personality correlates before, I'm presenting what little we have found.

The Briggs-Myers Type Indicator includes four personality dimensions:

introversion-extraversion

sensing-intuition

thinking-feeling

perceiving-judging

Peter Keen found that only the thinking-feeling dimension relates significantly to cognitive style. Systematics tend to be thinking types, intuitives tend to be feeling types. More intuitive have feeling intuition type than feeling sensing type; more systematics have thinking intuition type. Intuitive <u>style</u> is not significantly related to intuitive <u>type</u>. There is a slight tendency for intuitives to be extraverts and to be feeling perceiving types, but systematics do not have the opposite trends in introversion and judging.

In the Value Added Project, I compared style with factors which emerged in analyses of two questionnaires. Preceptive style relates to high factor scores on Achievement Motivation; receptive and systematic styles each relate to Tolerance and Flexibility; and intuitive styles relate to the Confused, Unsettled, Indecision factor. These personality correlates, like those with major and vocational choices, are simply tendencies for two characteristics to "go together". We have no idea what underlying casual factors contribute to them, although they make sense. Personality undoubtedly affects student/teacher interaction and personality correlates of style may add to student responses when style mismatches occur.

Is There a Relationship Between Students' Cognitive Styles and Their erformance on Written Assignments?

Since cognitive style is a pervasive individual difference, it ought to be easurable in different task situations. Written assignments take a wide range f forms, provide a longer time sample in which to examine style, and are subject o ambiguous (or at least highly variable) grading criteria. Style should affect ot only communication in written assignments, but also the kind of writing tudents prefer. In the absence of extensive research on written assignments, I n again using recent research on the McKenney model to illustrate issues in such nalyses. Discussions address written assignments which can relate to style ifferences, coding and analyses of written assignments, and obtained relationships etween style and written assignments.

Herb Zagarow and Dave Kingsley are currently completing studies of written ssignments of community college students*. Herb Zagarow asked students in one ondition to write "off the top of your head;" the second condition required utlining, then writing. One problem he encountered was controlling what students o when given these assignments (e.g. intuitives who write the essay first, then utline it). In an effort to obtain more information about writing, I revised Logic and Rhetoric of Exposition Test in which one must:

a) choose one of five essays to write,

b) explain why that essay was chosen, and

c) explain whether it succeeded or failed to top one's skills, and why?

These data alone have correlates to style as measured by standard instruments.

The two reports presented in this volume were not available at the Summary Activity.

Cognitive Style Codes for Logic and Rhetoric

Systematic:*

11 clear method or plan

12 defines constraints of the problem

13 considers alternative thoroughly

14 step-by-step analysis

Intuitive:

15 considers and discards alternatives quickly

16 oriented to overall problem

17 redefines problem in process

18 defends solution in terms of problem

19 jumps from one step to another and back

20 relies on hunches, unverbalized cues

Receptive:

21 suspends judgment, avoids preconceptions

22 attentive to detail and exact attributes of data

23 insists on complete examination of the data set before making conclusions

Preceptive:

24 looks for cues in the data set

25 focus is on relationships

26 jumping through data set, building a set of explanatory precepts

Joe Taylor's work adds two more operational definitions of the systematic mode which leads 6 codes for each strategy style): Relies on clear information or reason

mplies a good plan leads to a good solution

Can Prediction of Cognitive Style be Useful in Cognitive Style Implementation?

This question relates to work by Joe Taylor, who attempted to predict his students' cognitive styles, then assessed their styles. However, I'm also taking advantage of the opportunity to speak to other uses of prediction. Three such functions are:

1) to see if you can accurately estimate your own style,

2) to see if you can accurately assess others' styles,

3) to work toward clearer differentiation of style from strategy.

Joe Taylor supplemented his own predictions with an interactive plan for strategy development during the course. He shared his own style, style concepts and students' style data with them, then solicited their help in developing strategies to help them, themselves, and each other. The entire class was involved in the teaching/learning process throughout the quarter.

Anecdotal information from yourself and others such as is provided in the Joe Taylor report is especially helpful in obtaining confidence in style differences and their implications. If the style/strategy distinction is likely to affect you or your students, consider the following as ways of developing your anecdotes:

Do you do things for students that you wouldn't need done for yourself but feel some students need? What are examples?

Looking back over your professional career, think about an instance when you were highly successfuly, your "performance" represented you real "competence" in a satisfying way? What made it live up to your expectations of yourself? What intellectual skills are you proud of?

On the other hand, what event represents incredible frustration, you had something to say, but the message just couldn't get through? When do people seem dense to your pearls of wisdom, yet seem unimpressive or obstructive to you?

These questions relate to prediction in that their answers help you operationalize information-processing differences that should, in turn, help you predict your own and others' styles. They help sort your natural style from your more superficial, acquired strategies.

## Is Cognitive Style Related to Career Decision- Making?

Career correlates of style have often been investigated. Table 4 presents such correlates of the McKenney model; similar data on field dependence-independence is available in many of Witkin's articles. However, my focus in this discussion is the decision-making process. In their recent report, Wilson, Rosica, and Richardson conclude with three questions which merit further investigation.

The first question concerns style-related differences in methods of exploring careers. In implementing cognitive style in career selection, one component should be student evaluations of alternative means of exploring careers. This serves two functions. First, it provides alternatives for individuals at different stages in the simplicity-complexity sequence. Second, it provides an opportunity to better understand style as it is manifested in vocational decision-making. One asks not only what different careers are chosen by individuals with different styles, but also what differences exist in how careers are chosen.

Table 4. Cognitive Style and Career Decision-Making

A. Strong Vocational Interest Blank (Keen, 1973)

| Systematic: | Intuitive: |
|---|---|
| Production | Librarian |
| Army Officer | Psychologist |
| Personnel Director | Music Performer |
| Public Administrator | Social Science Teacher |
| Purchasing Agent | CPA Owner |
| Sales Manager | Life Insurance Salesman |
| | Advertising |
| | Author/Journalist |

B. Value Added Project Questionnaire*

| More often Systematic: | Intuitive: | Neutral or Balanced: |
|---|---|---|
| Teaching (Slight-trend) | Medicine (slight) | Applied Science |
| Business | Law | Paraprofessional |
| Politics | Government | |
| Research | Arts | |
| Clergy | Media | |
| Architecture | | |
| Psychology | | |

| More often Perceptive: | Receptive: | Balanced: |
|---|---|---|
| Arts | Business | Teaching |
| Architecture | Psychology | Medicine |
| | Research | Applied Science |
| | Politics | Government |
| | | Media |
| | | Clergy |
| | | Paraprofessional |

While career decision-making may be facilitated by reading about careers, by values clarification, by test results, and by a variety of other means, a second major question concerns role models. This question is especially important for field dependent, intuitive, impulsive and neutral styles. For individuals with each of these styles, role models provide the legitimacy critical to maintaining value freedom. Again a dual purpose is served: real people illustrate alternative careers while interpersonal contact is provided for individuals whose styles may favor learning through people.

While many kinds of cognitive style implementation can secure useful information, the greatest long-range efficiency comes from students learning about their styles, then having the opportunities to explore the consequences of style. In these cases, evaluation must be designed to monitor the total experience - the content and the process - including the difficulties and discouragements that may be involved. While promising success, happiness, and ready solutions might lead more people to invest in cognitive style, one purpose of cognitive style implementation is to be more honest with students and to allow them to be better informed about themselves and the learning and working environments in which they live. The more information we can acquire about the consequences of style information for learning, problem solving, and decision-making settings, the more quickly we can help students acquire more control over their experiences.

The six questions addressed in these comments remain unanswered. Cognitive style implementation has entered a new phase in addressing the needs of students, teachers, and counselors. Theory is being directly applied to practical problems, rather than being closeted in research laboratories. While such direct implementation is frustrating in that the inadequacies of theory are made visible, it also allows practitioners to make demands that theory meet their needs. The purpose of this paper has been to identify some of the issues involved in implementation

and to congratulate those who have taken major steps forward in cognitive style implementation. Hopefully, next year I can address further questions and review a few more answers.

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